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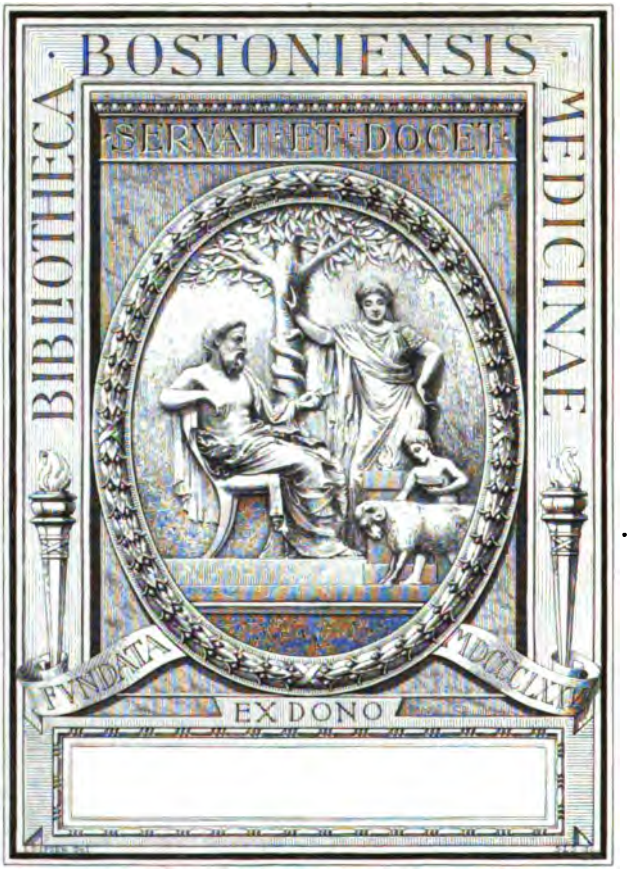
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THE SCOTTISH
MEDICAL AND SURGICAL
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THE HISTORY OF OBSTETRICAL ANATOMY

Introductory Lecture, Summer Session, 1905

By A. H. F. BARBOUR, M.A., M.D., F.R.C.P.

GENTLEMEN,—As there is an evolution of man, so there is an evolution of knowledge. The man of to-day is the product of centuries of men; the knowledge of to-day is the product of centuries of observation and thought. The Science of Obstetrics is as much the product of evolution as the human fœtus is.

In our course of lectures we have only to do with the science of to-day, the stage which our knowledge has reached at the present hour. We shall only look at and handle the developed organism, without troubling ourselves as to how it came to be there as we see it now; but an introductory lecture tempts one to go into the past and trace how the product of to-day has been evolved.

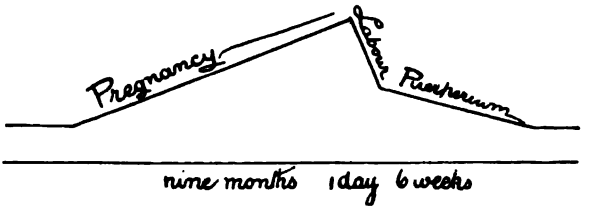
An essential part of one of the higher animals is its back-bone. They are classified according to this: those with, and those without a vertebral column. The back-bone of the Science of Obstetrics is Anatomy. The back-bone may not be the highest part, it is only the case of the nervous system, buf it is essential; we must have a back-bone. Now, as in building up a body you start with the skeleton and then clothe it with muscles, as in mastering the mechanism of a watch you ask first to see the form and relations of the wheels before you make them go round, so in the Science of Obstetrics you begin with a basis of anatomical data.

It was not exactly thus that our Science grew, and it was so much the worse for its growth. Men studied the movements on the dial-plate, they listened to the ticking, and shook it to

see what effect that had, before it occurred to anyone to open the case and take out the works. Their mistakes confirm instead of weakening the proposition that Anatomy is the backbone of Obstetrics.

Obstetrics is the science of parturition, of bringing forth, of labour—if you drop the fœtus and look at the mother only. But the uterus in labour implies a knowledge of the uterus in pregnancy; and that again of the uterus in a non-pregnant state. And to these we must add the puerperium, because it is not till six weeks after labour that the uterus returns to the condition before pregnancy.

All of these periods hang together. They form a complete cycle, which we might represent graphically thus:—



and to complete our idea of the cycle we add the length of time over which these changes extend.

These are the divisions of the subject we have to study together here, and that is the order in which we study them.

In the same order has our knowledge of the anatomy of obstetrics grown. The foundation of our knowledge was laid in three successive periods: that of the uterus before labour being the contribution of the first and sixteenth centuries; that of the uterus in pregnancy of the eighteenth; that of the uterus in labour and during the puerperium of the nineteenth. By our knowledge of anatomy, I mean of "naked-eye" anatomy, of gross anatomy, what you can see and handle, and which gives a direct basis for clinical work. Microscopic anatomy came in at a late period, its development being, of course, conditioned by the invention and improvement of the microscope.

Anatomy of the Uterus before Pregnancy.

Some years ago I collected the facts with regard to the early contributions of Anatomy to Obstetrics, which are given

in the paper which has been placed in your hands.[1] In it, you will get the material which has suggested the general conclusions which I bring before you now, with regard to the anatomy of the uterus before pregnancy, and also in part, during pregnancy. We have also here the monuments which these grand old workers left behind them, each book representing the life blood of a master spirit.

It is difficult for us to throw ourselves into the time when the obstetrician never had had a human uterus in his hand, never had seen it, and only thought it was like that of a dog or cat whose entrails he had casually looked at. There was a time, however, when, anatomically, the genital tract was absolutely a *terra incognita.* And what was the result of this ignorance? The imagination, instead of playing round fact and constructing the hypothesis by which knowledge strides on to-day, wasted itself in grotesque theories: as, for example, that the uterus was double, and, like a double-barrelled gun, discharged male fœtuses from the right, females from the left barrel; that the fœtus sat placidly on the brim of the pelvis for nine months, and then took a header into the new element of the outer world; that these months were spent, amongst other things, in learning the art of sucking (for how otherwise could it do so intelligently from the first); and that there were mammæ in the uterus on which it practised the art. Such ideas give us a glimpse into the state of the science of Obstetrics before the days of Anatomy.

But that we may not under-rate the past, there is a jewel in the rubbish heap of the first centuries which is well worthy of study. If you have patience to read through the chapter on Anatomy from Soranus in the "Early Contributions," you will find much that is very suggestive. He lived about the end of the first century, and left behind him this monograph on the anatomy of the uterus, which laid the foundation of our knowledge.

This chapter on Anatomy shows how a man is often broader than his school. Soranus was brought up as a Methodist—not in religion, but in science. The schools of that day were three: the Empirical, which believed in the

[1] "Early Contributions of Anatomy to Obstetrics," *Edinburgh Obstetrical Transactions*, 1887-88.

rigid study of *one* field of research by observation and experiment alone; the Rational, which held that a man should be broader than his subject, and make use of all collateral science to aid him in understanding his own branch; and the Methodist, which started with an *a priori* classification of disease, and made what they saw fit into their system of knowledge.

We have these schools with us still, and each of us finds himself in turn dominated by the phase of mind which each school embodied. In diagnosis, for example, how liable one is to be a Methodist—some symptom suggesting an idea of a disease into which we make everything we discover later fit in.

Soranus was a Methodist in name, but he embodied what was best in the empiric and the rational. It is very fine how he apologises for his natural bent towards empiricism, *i.e.* to observation and the study of anatomy. Listen to this. After describing the qualifications desirable, both in studying and practising the art, he says: "But since we are about to pass to the description of what occurs to women in health, we must first explain the structure of the organs, which in part can be studied directly, in part by anatomy; and although it is of no use, nevertheless, since it is held to be a part of enlightened education, we shall teach what is known of it. For we shall be more readily believed when we say that anatomy is useless, if we have first shown ourselves to be acquainted with it; nor shall we provoke the suspicion that to cover our ignorance we have depreciated one of those subjects which are deemed useful." After paying this tribute to the view of his school, he gives an admirable account of the anatomy of the organs of generation.

Is he talking seriously here, or merely poking fun at his brother Methodists, who despised anatomical facts? If it is fun, it is amazingly clever.

The anticipations of the results of modern investigation are a remarkable illustration of how a mind may throw out ideas without understanding their full significance. The allusions to the displacements of the uterus by pelvic inflammation, the opening of the os externum during coitus and at menstruation, and the menstrual flow as coming from the body of the uterus, cannot be regarded as more than happy suggestions.

The isolation of the centres of learning at that time was a great obstacle to the growth of science. Good work done was the property of only a few: to-day it becomes in a month the possession of the whole scientific world, and can never be lost. Soranus and his work dropped out of sight, and the result was that our science underwent retrograde development. Galen,

DE ANATOMIA
tilidones: & vides qualiter collum Matricis eſt ſine conſiſdonibus: & vi-
des qualiter collum aſſimilatur virgæ virili.

Page from Berengario's "Anatomy," with the first representation of the uterus.

for example, the father of Medicine, sits down gravely in the same century to describe the human uterus, although he had evidently never seen it. In speaking of the uterus, he says that other writers "mix up and suggest to the mind absurdities, since they cannot explain the use and action of the horns. And as my discourse would be too long and also unequal if I spoke of the use and action of the horns, and not of the other structures round the uterus, on that account this subject is to

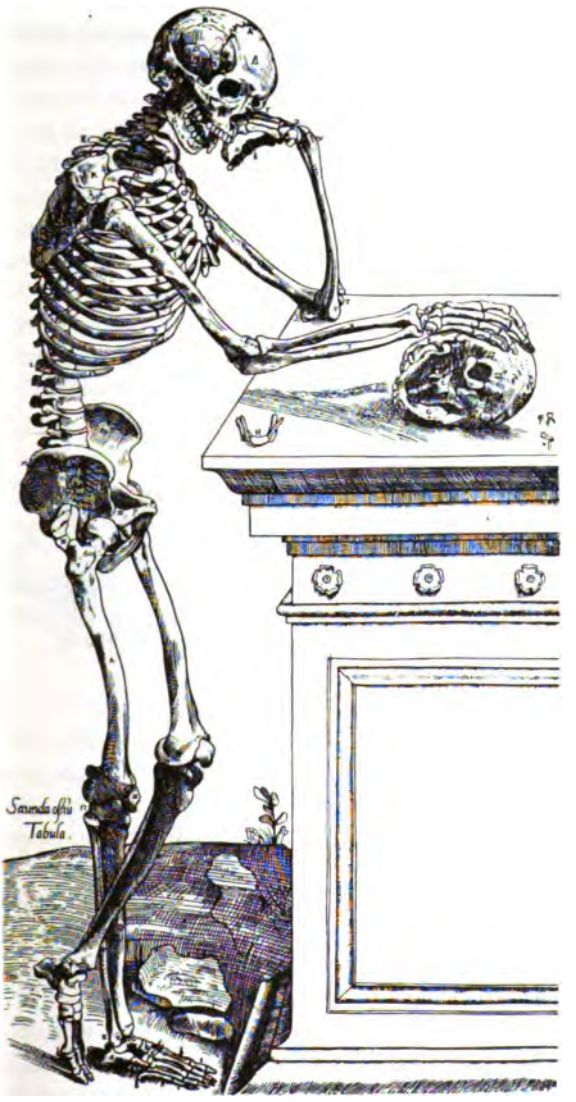
be deferred to another treatise"—which treatise, fortunately for Galen's reputation in obstetrics, was never written.

Aretaeus also, a contemporary of Galen's, speaks of the uterus as "a female viscus closely resembling an animal, moved of itself hither and thither in the flanks," in a word, altogether erratic. We are back again in the region of grotesque fancy. It was not till the sixteenth century that real progress was again made. There are four names of note in this century—Berengarius, Vesalius, Eustachius and Fallopius.

In looking at their work we must remember that all the work of Soranus was forgotten and had to be done over again. When Berengarius came to take the chair of Surgery in his native town of Bologna, the text-book of Anatomy, which for two centuries students had been required by law to learn their science from, taught that the uterus consisted of seven cavities. Berengarius was an enthusiast in Anatomy. In his *Isagoge brevis*, which is of interest as being the first text-book of Anatomy illustrated with drawings, it is noteworthy that the only viscus which he considers worthy of reproduction is the uterus. This plate is of peculiar interest to students of Midwifery, as being the first representation of the human uterus. There is grim humour in representing the human figure as demonstrating on her own uterus the fact that that organ contains but one cavity. Is she spurning with her left foot the standard text-books of Anatomy with their misrepresentations of the uterus, while she points with her right hand to the real thing and says, "there is what it is like"? The scientific spirit rather resents the representation of this being done by the living figure, but we must remember that at this time the artists and anatomists were working hand in hand. The anatomist was teaching the artist what to draw, showing him the bones and muscles which built up the figure; the artist was teaching the anatomist how to draw, and at this time himself illustrated the anatomist's work for him—and we must pardon the artist's vagaries.

The next representation of the uterus is given us by Vesalius. A native of Belgium, he became Professor of Anatomy at Padua, and thus joined the Italian School of Anatomists. His thirst for anatomical knowledge was insatiable. The circumstances of his death illustrate the passion

of his life. He died on a pilgrimage to Jerusalem, the reason for which was that he had cut down on the heart of a man



Vesalius'.plate of the Skeleton.

who had just died that he might feel it beating with his hand. Through the clemency of Philip II. he was allowed to expiate

his crime by a pilgrimage to Jerusalem. On his way home he was wrecked. In his Atlas we find the same association of Anatomy and Art that we have referred to. What could be more picturesque than this skeleton meditating on this skull? Look at the pose of the limbs. The expression put into the bones of the face, and the feeling in the bones of the right hand showing how much feeling can be embodied in pure form. His drawings of the uterus both from the outside and in section are more accurate than the rough representations of Berengarius. The drawing of the uterus from the outside has crept into the text-book of Anatomy of Moschion, which dates from the fifth century. It was long thought that Moschion's picture of the uterus was the oldest on record, but you will find in the "Early Contributions" that the picture of the uterus in Moschion is really a late interpolation into the book of this drawing from Vesalius.

A few years after Vesalius published his Atlas, Eustachius produced his Anatomical Plates, although they were not published in their present form till nearly two centuries later. He shows us the external genitals, the fundus as seen through the brim, the uterus and vagina, removed from the body—seen from the outside and in coronal section. Of special interest is a drawing of the human fœtus with its membranes and placenta, which is, I believe, the oldest we have.

But there is one thing we miss in these pictures: the uterus is there, but not the Fallopian tube. For it remained for Fallopius to describe that structure with which his name has ever since been associated. The significance of his discovery will be at once apparent from the fact that till his time it was thought that there was no communication between the ovary and the uterus, and hence that "the seed of the female

played no part in the production of life." His description of the tube is so interesting that I must give it :—

"That slender and narrow seminal duct rises, fibrous and pale, from the horn of the uterus itself; becomes, when it has gone a little bit away, appreciably broader, and curls like a branch (capreolus) until it comes near the end, then losing the horn-like curl, and becoming very broad, has a distinct extremity which appears fibrous and fleshy through its red colour, and its end is torn and ragged like the fringe of well-worn garments, and it has a wide orifice which lies always closed through the ends of the fringe falling together; and, if these be carefully separated and opened out, they resemble the orifice of a brass trumpet. Wherefore since the seminal duct from its beginning to its end has a likeness to the bent parts (capreoli) of this classic instrument, separate or attached, therefore it has been called by me the *Uteri Tuba.* These are present not only in the human bodies, but also in the sheep, cows, and all other animals which I have dissected."

Besides the discovery of the tubes, we are indebted to Fallopius for complete descriptions of the external genitals, the hymen, the round ligaments, the ovarian and uterine arteries with their anastomoses, and of the ovaries. Our knowledge of the uterus before pregnancy is now fairly complete.

Anatomy of the Uterus in Pregnancy.

Our knowledge of the uterus in pregnancy dates from the middle of the eighteenth century. Vesalius had given a drawing of the fœtus with its membranes, and Fallopius had dissected the vessels in the placenta as well as the bones of the fœtus; but it was not till the middle of the eighteenth century that the anatomy of pregnancy was systematically studied. At that period there were produced—following each other in rapid succession—four splendid contributions, which not only laid the foundation of our knowledge, but left it so complete that little remained to be done except in the region of microscopic anatomy: to the work of Albinus, Smellie, Roederer, and William Hunter, the obstetrician of to-day still turns for anatomical facts with regard to the uterus in pregnancy. These four men have left behind them these splendid monuments, and we note with pride that two out of the four are Scotsmen.

Here is the Anatomical Atlas of Albinus, the result of fifty years' continuous anatomical work. Before looking at his plates we will glance at those of the skeleton and muscles. As works of art, they are simply perfect. The careful drawing makes the anatomical subject the central figure; while the skilfully introduced background lightens the grimness of the subject. His seven plates of the Gravid Uterus, published in 1747, are the first drawings we have of the uterus in pregnancy. Though they lack the accurate detail which characterised Hunter's work, they show very well the form of the uterus and the relations of the fœtus and placenta.

Smellie was a native of Lanarkshire and the greatest name in British Obstetrics in the eighteenth century. When he was about forty years of age he went to London, where his fame as a teacher drew pupils from all parts of the world. During ten years he passed nearly a thousand pupils through his hands—a remarkable fact when we remember that they did not attend his lectures to obtain a certificate, but entirely from enthusiasm for him as a teacher. In estimating the value of his work, we must remember that many of his plates are evidently prepared for teaching purposes, rather than giving the results of anatomical investigation; in fact, his plates fall into two groups—drawings of actual dissections and representations of facts only observed clinically.

Roederer and Hunter were both pupils of his. Roederer has given us a series of plates similar to those of Albinus, but more accurately drawn, those of the cervix and the ovary being especially good. It is to William Hunter's Atlas, however, that the obstetrician always turns as a masterpiece and model of perfect work in obstetrical anatomy. As we turn over the plates in his Atlas, masterpieces of careful dissection and accurate drawing, or read his terse and lucid account of the uterus, its contents and membranes, we are at a loss whether to admire more his patient labour in accumulating a wealth of material such as no other has done before or since, or the painstaking care with which it has been examined and described. His Atlas contains dissections of pregnant uteri from every month of gestation, with cases of head presentation, breech presentation, placenta prævia, and retroversion of the gravid uterus. In the preface, he says that there are two kinds of

anatomical drawing—"one is the simple portrait, in which the object was represented exactly as it was seen; the other is a representation of the object under such circumstances as were not actually seen, but conceived in the imagination.

"That figure, which is a close representation of Nature, and which is finished from a close view of one subject, will often be unavoidably somewhat indistinct or defective in some parts; the other being a picture of fancy, made up perhaps from a variety of studies after Nature, may exhibit in one view what could only be seen in several objects, and it admits of a better arrangement, of abridgement, and of greater precision. . . . A very essential advantage of the first is, that as it represents what is actually seen, it carries the mark of truth, and becomes almost as infallible as the object itself."

His work, he said, was to be "a faithful representation of what was actually seen," and as a proof of the persistency with which he has kept to his ideal is the fact that, while more recent anatomical work has by new methods added to, it has not overturned any of his results. So much for the Uterus in Pregnancy.

Anatomy of the Uterus in Labour and the Puerperium.

Dr Barclay, our extra-mural lecturer on Anatomy in the beginning of the nineteenth century, on one occasion said to his class :—

"Gentlemen, while carrying on your work in the dissecting-room, beware of making anatomical discoveries; and, above all, beware of rushing with them into print. Our precursors have left us little to discover. You may perhaps fall in with a trifling supernumerary muscle or tendon, a slight deviation or extra branchlet of an artery, or perhaps a minute stray twig of a nerve—that will be all. But beware! Publish the fact, and ten chances to one you will have it shown that you have been forestalled long ago. Anatomy may be likened to a harvest-field. First come the reapers, who, entering upon untrodden ground, cut down great store of corn from all sides of them. These are the earliest anatomists of modern Europe, such as Vesalius, Fallopius, Malpighi, and Harvey. Then come the gleaners, who gather up ears enough from the bare ridges to make a few loaves of bread. Such were the anatomists of

the last century—Valsalva, Contunnius, Haller, Winslow, Vicq d'Azyr, Camper, Hunter, and the two Monros. Last of all come the geese, who still contrive to pick up a few grains scattered here and there among the stubble, and waddle home in the evening, poor things, cackling with joy because of their success. Gentlemen, *we* are the geese."

His witty statement is not true for the anatomy of the uterus in labour, which was as yet untouched. It is only during the last quarter of a century that an anatomical basis for the changes in labour has been discovered. It was not till then that the method by which this has been done was applied. Let me indicate in a word the nature of the difficulty which this method had to get over. In passing from the study of the uterus in pregnancy to the uterus in labour, you pass from a body at rest to a body in motion. Reverting to our simile of the works of the watch, we may say that pregnancy is the winding up the watch through nine months, while labour is its running down in twenty-four hours. Now, the description or representation of a watch in motion is much more difficult than that of one at rest. You require an instantaneous camera for this. To catch the uterus in the act of labour is the problem ; and there is only one way of doing it—by frozen sections taken from the various stages of labour. To change the metaphor, you might describe labour as the movement of a given body along a given tract under the action of given forces. It was as difficult to follow these movements before the introduction of sectional anatomy as to observe those of a running horse before the days of instantaneous photography. Now, we can catch every successive movement of the horse's limbs and fix them so as to compare them deliberately. Sectional anatomy in the same way seizes labour in its different stages as well as the child's different movements. This new method was first employed by Braune at Leipsic in 1870. His section of the uterus in labour was the first of the series of frozen sections which are being added to every year, and of which you see the results in this pile of Atlases. They give us the anatomy of the uterus both during labour and in the puerperium.

This brings the evolution of the anatomy of the uterus through its various stages from the non-pregnant condition

to the puerperium, and from the first century to the present time.

In going over the work of these "brave old fellows" who laid the foundation of our knowledge, one is impressed with the character of the men as much as with the quality of their work, with the spirit in which they worked as much as with the work they turned out.

And especially with these two characteristics: the generous interpretation they put on the work of others and the devotion with which they did their own. As illustration of the generous spirit, let me give you this from Fallopius. Speaking of the error of Hippocrates in describing the cotyledons of the placenta as cups containing nutritious material heaped up in them for the nourishment of the fœtus, and after pointing out their real nature, he says:—

"This being settled, what shall we say if Hippocrates mentions 'cups'? May the Manes of so great a man spare me, a man who was the presiding deity of the medical art, when I say that he spoke the truth in words that deceived! For if anyone would doubt (my opinion) that crude or cold humours or even mucus contained in the uterus are the cause of abortion, he would walk blind in daylight; but that these humours are contained in cotyledons is false, because there are no cotyledons."

There is no energy wasted in discussing priority of discovery; instead of claiming discovery for himself, the investigator rather seeks to read his own work into that of a predecessor, so that the latter may get the credit of it. This is what every man can do. It is given to a few to have a great mind. It is within the reach of everyone to be great-minded.

The devotion with which they did their work is aptly expressed by Wendell Holmes when he says that "they put their lives into their books." Each book represents a life; that is why the books live to this hour. I do not mean that a man did more in his day than is done now. With our improved instruments, it would be a wonder if we did not turn out three or four times the amount of work. But it is their devotion to their work — putting a life into a book. The

facilities for publication nowadays are a source of weakness as well as strength. While they prevent anything from being lost, they tell against the production of good work. The scientific man is not to blame for this, nor should he find fault with it. An organism does not quarrel with its environment. Nevertheless, it is true that the tendency towards the diffusion of knowledge is against its maturing.

The work of Albinus is the best illustration of what we mean by the devotion with which these men worked. His contemporary, Haller, says of him :—

"I have always praised the good fortune of Albinus, and should almost have envied it if that loftiest of men had not used so well the great opportunity he had. This distinguished man gave more than fifty years to a single art, drawn aside by no other duties ; he was able to forego all honours for the perfecting of his subject."

And the result of these fifty years was this folio, which aroused the enthusiasm of Master Byles Gridley :—

"And look here, doctor, I couldn't help getting this great folio Albinus, 1747 ; and the nineteenth century can't touch it, doctor—can't touch it for completeness and magnificence, so all the learned professors tell me ! Brave old fellows, doctor, and put their lives into their books, as you gentlemen don't pretend to do nowadays."

The magnificent contributions made by these "brave old fellows" has an almost paralysing effect on our efforts to-day. And yet it should not be so. In some parts of the Pacific, islands have been reared by the coral polyp. From the sea-bottom upwards to within a few feet of the surface the work has been done by past generations of polyps, who carried the reef upwards as the ground was slowly sinking and becoming submerged. On the top is a narrow belt of living coral, the workers of this generation. They live where life is alone possible for them, in the broken water, and secrete from the sea the material for the reef. Such is the progress of Science. It is on the work of generations who have passed away that we build. Around us lies truth, wide and deep like the sea. It is the opportunity and duty of each worker to separate a few grains of knowledge from the ocean and add it as his contribution to the pile.

A CASE OF ALEXIA WITH AUTOPSY[1]

By EDWIN BRAMWELL, M.B., F.R.C.P.E., M.R.C.P.Lond.,
Assistant Physician, Leith Hospital

CASES of word-blindness are not uncommon, although there are comparatively few recorded instances in the literature in which the brain has been examined post-mortem. The following record of such a case, though somewhat meagre in clinical detail, since unfortunately the full report of the aphasic condition has been mislaid, may prove of interest in connection with Dr Paterson's remarks. The accompanying photographs illustrate the position of a lesion which was associated with pure (or almost pure) alexia. My acknowledgments are due to Dr Byrom Bramwell for permission to publish the case, of which the following is a brief account.

Clinical Record.

The patient, a man aged 63, was admitted to the Royal Infirmary suffering from chronic bronchitis, emphysema, and cirrhotic Bright's disease. It will be unnecessary for our present purpose to refer in further detail to any of his symptoms which have not a direct bearing on the aphasic condition. On the patient complaining that his sight had been failing for a year past, he was sent by the house-physician to the Ophthalmic Department, where Dr Paterson ascertained that he had right homonymous hemianopsia and word-blindness.

The following facts of special importance in connection with the patient's aphasic state were subsequently elicited :—

Firstly, that although the patient's memory, more especially for recent events, was very defective, his intelligence was up to the average standard ; secondly, that he was a right-handed man ; thirdly, that his visual acuity was good ; fourthly, that there was no weakness of the right hand ; fifthly, he stated that he had previously been a good reader, and was considered a good, though never a fluent writer.

A special examination of his speech functions showed that he understood everything that was said to him and that he expressed himself fluently and well, in other words there was no evidence that the functions of the auditory speech centre

[1] Read before the Medico-Chir. Soc. of Edinburgh.

and motor-vocal (glosso-kinæsthetic) centres were in any way impaired.

When the patient's ability to read was tested, it was found that he had the greatest difficulty in naming letters and words. When he was asked, for example, to name the capital letters A, C, O, B, H, V, he failed in every instance with the exception of the O and the V. This failure to recognise letters was not dependent upon inability to see them, to a defect of vision, in other words, for, as already stated, his visual acuity was good. He could make out the shape of the letters perfectly well, but the symbols of written speech conveyed no meaning to him. In addition to this pronounced degree of letter-blindness, he had almost complete word-blindness. With the exception of one or two monosyllabic words, he was unable to read any of the numerous printed and written words which he was asked to decipher. During the course of his examination the patient made the interesting statement—"I can spell a thing, doctor, and I cannot tell the meaning of it if I see it like in reading, but I can spell it without looking at it." In marked contrast to his disability to interpret letters and words, was his ability to recognise numerals. He made occasional mistakes, it is true, but he recognised promptly, for example, the numbers 100, 931, and 1346. This comparative preservation of ability to decipher numerals is not at all uncommon in cases of letter and word-blindness.

Was the alexia in this case dependent upon a lesion of the cortex in the region of the angular gyrus, or had it resulted from an interruption of the connection with the half vision centres in the occipital lobes and, according to Bastian, the angular gyrus of the right hemisphere?

Dr Paterson has referred to the special features which characterise a lesion in these two situations. He has discussed the close association which exists between the visual word centre and the writing or cheiro-kinæsthetic centre, and he has alluded to the necessary integrity of the visual word centre where the ability of expression in written speech is retained.

The great distinction between a lesion destroying the visual word centre and one which destroys the connections of the centre with the lower centres, leaving intact the parietal cortex,

is the preservation in the latter case of the ability to write (pure word-blindness).[1]

Were the symptoms in the case above described dependent upon a lesion of the parietal cortex (angular and supramarginal gyri) or of the white matter subjacent to it? The answer to this question involves, as may be seen from the foregoing remarks, an inquiry as to the patient's ability to express himself in written speech.

When the patient was asked to write the sentence "I come from Edinburgh," he did so promptly, correctly, and without hesitation, but not until the first letter of the sentence had been written for him. In other words, he was able to call up the equivalent visual memories (of the auditory speech symbols which he had just heard) necessary for the interpretation of the sentence into written characters. A number of other examples might be cited to illustrate the fact that the patient's writing was all but intact. The curious circumstance that the only obvious defect in writing was an occasional inability to write a word or sentence until the first letter had been written for him is of interest. This inability to recall the first letter would seem to suggest some slight defect of the visual word centre, the centre for the recall of visual memories. The absence of agraphia, apart from the slight defect in writing above mentioned, seemed to show that the visual word centre was intact and the diagnosis of pure word-blindness dependent on an occipital or, as it is sometimes termed, subcortical lesion, using the word subcortical in relation to the parietal cortex, was made.

There are two or three additional points of interest worthy of reference.

In the first place, it was interesting to note that the patient within five minutes of writing a sentence was unable to read what he had written. The explanation of this phenomenon, which is of common occurrence in cases of pure word-blindness, is obvious. Secondly, it was noted that although he was unable to read certain words written in large characters on the black-

[1] Bastian, it is true, has postulated a form of pure word-blindness, to which he applies the term parietal as opposed to occipital, in which a destructive lesion of the visual word centre is unaccompanied by agraphia, but the existence of this parietal type of pure word-blindness has not as yet been substantiated, so far as the writer knows, by conclusive post-mortem evidence.

board, after he had traced over the words with his finger he was, in some instances, able to decipher them. This reviving of the visual memories of words and letters in the visual word centre by the kinæsthetic impressions received during the act of writing is not uncommon in cases of alexia in which the parietal cortex is intact.

The patient's attempts at copying were interesting. When asked to copy the capital letter A, the name of the letter not having been previously mentioned to him, he did so in a laboured way, like a child learning to draw a previously unseen object, putting in each detail of the crude copy, and obviously quite oblivious of its meaning.

The only additional points in the case which I intend to mention are, that there was no hemiplegia and no hemi-anæsthesia. The presence of a right homonymous hemianopia, which was of the classical type, has already been referred to.

Although no definite history was obtained as to whether the symptoms developed suddenly or gradually, the condition of the arterial system, and the absence of general symptoms usually associated with a new growth, made it probable that the cerebral lesion was of vascular origin. The patient died, three weeks after admission, with cerebral symptoms suggestive of uræmia.

Post-mortem Record.

At the post-mortem examination, when the brain was removed a large area of softening in the posterior part of the left hemisphere was at once apparent. After the brain had been left in 10 per cent. formalin for a few days to harden, the distribution of the softening was more carefully studied. It was then seen that the softening corresponded very closely to the commonly figured area of supply of the posterior cerebral artery. The artery had, unfortunately, been removed piece-meal with the leptomeninges, so that it was no longer possible to look for or demonstrate the presence of the clot, which no doubt existed in its interior.

The situation of the softening, which, on section of the brain, was seen to be obviously of old standing, is well shown in the accompanying plates.

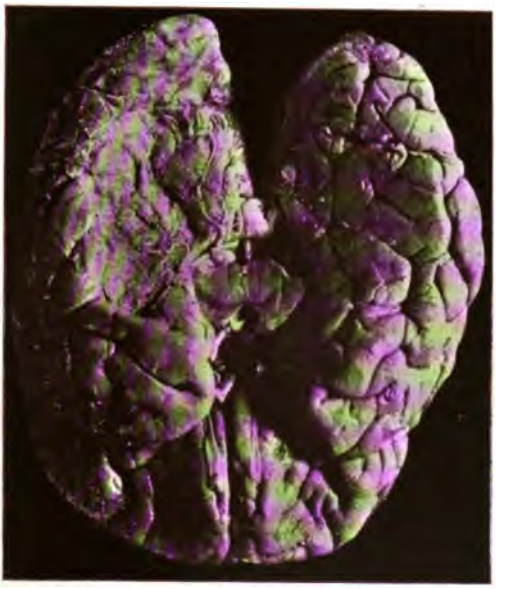


FIG. 1.

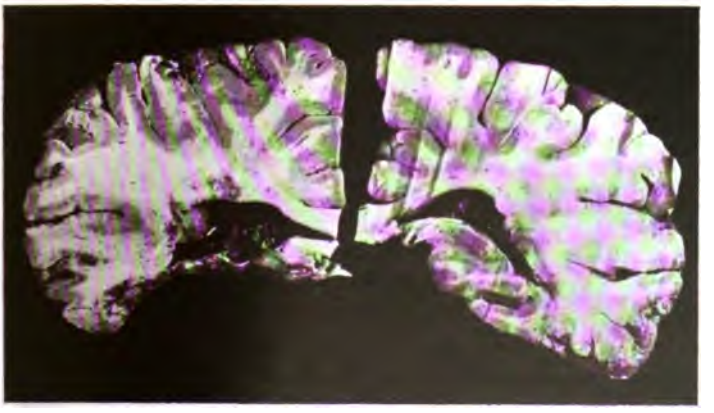


FIG. 2.

PLATE I.—TO ILLUSTRATE DR EDWIN BRAMWELL'S PAPER.

On looking at the under surface of the brain (Fig. 1), the complete involvement of the left occipital lobe, which has lost its normal convoluted appearance, is evident. Further, there is extensive softening of the under surface of the temporo-sphenoidal lobe, including the posterior two-thirds of the gyrus hippocampus, a large portion of the fourth, and the posterior portion of the third temporo-sphenoidal convolutions. It was impossible to strip the meninges off the brain in this region—in fact, in the anterior part of the softening, as may be seen in Fig. 2, the floor of the ventricle was formed by the lepto-meninges alone.

Looking at the internal surface of the left hemisphere (Fig. 4), which has been separated from its fellow by a mesial longitudinal section through the corpus callosum and basal ganglia, the limitation of the lesion to the occipital lobe is well brought out in the photograph. The cuneus is seen to be destroyed, but the parts anterior to the parieto-occipital fissure have escaped.

A study of the outer aspect of the left hemisphere (Fig. 3) shows the destruction of the second and third occipital convolutions and implication of the extreme posterior end of the second temporo-sphenoidal. The supra-marginal convolution which surrounds the posterior extremity of the fissure of Sylvius is seen to be intact, and the softening stops short posterior to the angular gyrus, which convolution is related to the termination of the first temporo-sphenoidal fissure.

Now, let me draw your attention to Fig. 5, which represents the appearances seen in a vertical transverse section through the parieto-occipital fissure and the most posterior part of the angular gyrus (*vide* Fig. 3). The section through the right hemisphere, as shown in Fig. 5, is slightly anterior to that which passes through the left. The softening of the lower part of the left occipital lobe is evident in this section. The yellow appearance of the softening, which is characteristic of an old standing lesion, was in this situation very striking. The destructive process extends upwards on the internal aspect as far as the calcarine fissure which it involves. On the outer aspect of the hemisphere the lesion stops short at what I take to be the lower part of the second occipital convolution, and does not implicate the cortex of the angular gyrus. Reference

to Fig. 3 shows the vertical incision which represents the level of the section shown in Fig. 5, and renders possible a comparison of the convolutions through which the incision has passed. I take it that the fissure seen immediately below the word "gyr" in both Figs. 3 and 5 separates the angular gyrus above from the second occipital convolution below; some, however, may hold that the convolution to which I have here referred as second occipital should be included as part of the angular gyrus. It is difficult to speak dogmatically upon the point, more especially since the type of convolution of the opposite hemisphere showed considerable differences. If we grant that this convolution belongs to the angular gyrus, we must admit an implication of the posterior part of the visual speech centre. The special point which I wish to emphasise is, however, that the cortex of the supra-marginal convolution and of the angular gyrus (except perhaps in its inferior and posterior part) are not included in the softening. This was confirmed by microscopic examination.

A number of other vertical transverse sections were made through the brain at different levels and photographed. I shall only show you one of these, however, namely, a section through the splenium or posterior extremity of the corpus callosum (Fig. 2). In this section, which passes through the extreme anterior part of the angular gyrus, the complete disappearance of the hippocampal gyrus and of the fourth and third temporo-sphenoidal convolutions is well shown. The cortex of the angular gyrus appears in this situation to present a normal appearance, an observation which was confirmed by microscopic examination.

There is one additional point which is deserving of special reference. In this section (Fig. 2), in the region where the upper limb of the corpus callosum leaves the left hemisphere immediately dorsal to the lateral ventricle, it is possible with the naked eye to make out the presence of disintegration, which is very evident in Weigert-Pal preparations.

Summing up the pathological appearances met with in this case, and applying them to the clinical history, we may say that the symptoms were dependent on an extensive cerebral softening, obviously of old standing, and occupying the distribution commonly accorded to the posterior cerebral artery. The

fibres connecting the region of the calcarine fissure in the left occipital lobe with the optic tracts must, from the position of the lesion, have been destroyed, hence the hemianopia.

The circumstance that writing was little interfered with is explained by the integrity of the cortex of the supra-marginal and angular gyri. The slight defect in writing referred to in the history of the case may have been accounted for by the somewhat debatable implication of the lower portion of the posterior limb of the angular gyrus. It is obvious that the fibres connecting the left occipital lobe and the visual word centre must have been destroyed, and, from the extension of the softening forward, it is seen (Fig. 2) that the fibres connecting the latter with the right occipital lobe (and perhaps also with the right angular gyrus), which pass through the posterior part of the corpus callosum, have probably been interrupted.

THREE CASES OF WORD-BLINDNESS WITH REMARKS[1]

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THE discovery of the existence in the cerebral cortex of special circumscribed areas which act as receptive and guiding centres in the interpretation and production of speech, spoken and written, excited an interest which has extended far beyond medical circles. The charm of the subject of aphasia no doubt lies partly in the opportunities it offers for speculation regarding the workings of the brain as the organ of mind. Dr Elder, in the preface of his work on Aphasia, says: "The subject, if we thoroughly understood it, would, I believe, give us the key to a knowledge of a great part of the mechanism of cerebral functions."

We think that the accumulation of combined clinical and post-mortem evidence will gradually clear up many of the obscure problems connected with aphasia. Apart from differences due to the varied mental endowment and education of individuals, similar lesions must produce corresponding results. Unfortunately, the organic lesions causing speech defects are

[1] Read before the Medico-Chirurgical Society of Edinburgh.

seldom exactly localised and circumscribed, and much difficulty has been found in bringing into harmony the apparently conflicting results which have followed involvement of the speech centres. In interpreting the results of a given lesion, the education, the occupation, and habits of the individual affected must never be lost sight of.

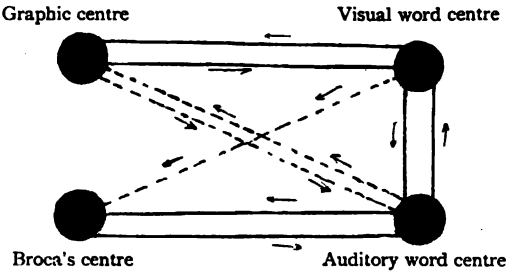


Diagram to show the relative positions of the speech centres and the way in which they are connected by commissures.
The dotted lines indicate possible but less habitual paths.

The diagram taken from Bastian serves to show the general arrangement of the centres and the relationships which that writer supposes them to bear to each other. We think all will admit with Bastian the primary and fundamental importance of the auditory word centre. Broca's centre for speech production is the other primary centre, the two forming what Wyllie calls the primary couple. The visual word centre must, in our opinion, take a subordinate position to these essential primary centres. It is an artificial product slowly elaborated in the process of a child's education. The writing centre is a further educational development.

The close relationship of these four centres and the way they contribute to fix the mental image of a word are well exemplified by the method a child will adopt when a strange word has to be learnt. The child will spell out the word slowly, enquire how it is pronounced, then repeat it aloud several times, and finally, perhaps, write it down in order to fix it still more firmly in the memory.

In silent thought the counters we commonly use are the auditory word images. In many people thought is greatly aided by a sort of silent articulation of the words. Some people are apt to think aloud, especially when deeply absorbed

in a subject. In a small percentage of people, so-called "visuals," the visual word images are said to take the foremost part in the recall of words and to be used as thought counters. Such a condition would appear to me to be altogether abnormal, but it is, of course, absolutely unwarranted to dogmatise regarding the mental processes of other people from a study of one's own.

At the same time with regard to this question of "visuals," certain misconceptions are, we think, apt to arise. When I think of a word, as in recalling the name of an object, I mentally hear it, and am also conscious of a sort of silent articulation, the latter element of recall increasing as the attention is concentrated on the word. Concentration on the word also tends to call up its visual image. It may well be that in some people the visual word image comes more readily and prominently forward than in others. To what extent the visual word image can be used alone, *i.e.* without reference to the auditory or articulatory word images, is a subject not yet fully elucidated. It has been shown that after lesions which apparently destroyed the auditory word centre, the power of understanding written or printed words may be retained, so that we are bound to suppose that the visual word image may in certain cases be interpreted without appeal to the auditory or articulatory equivalent. Hinshelwood appears to take it for granted that in a person well accustomed to read, the visual word image wholly or mainly carries the meaning which the word bears. We would rather adopt the view that ordinarily the visual word image is interpreted to a large extent through its power of calling up the more fundamental auditory and articulatory images. In people accustomed to read much aloud, there is probably, as Bastian suggests, a direct connection established between the visual word centre and Broca's centre.

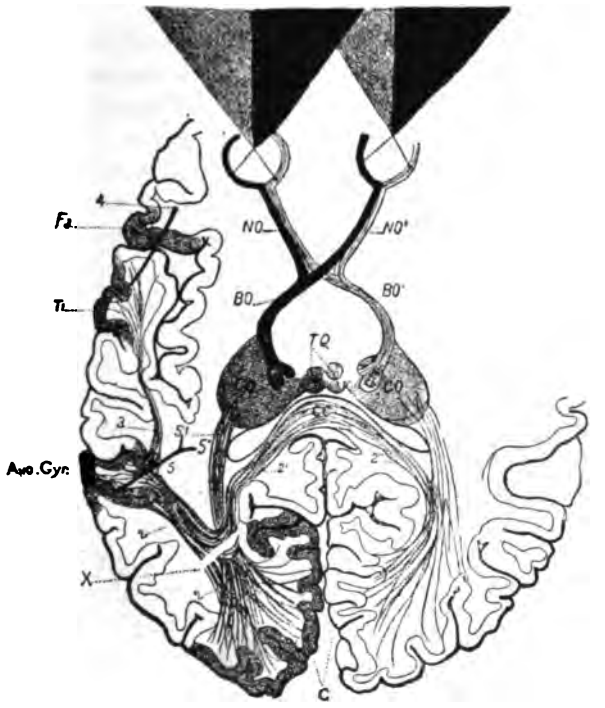
The statement sometimes made that some "visuals" can picture and read off pages of print, etc., is misleading. In reading we never see more than short words, or the syllables of longer words, at one time, and the parts of the page not directly fixed are seen quite vaguely and indefinitely. We interpret a quick succession of images, the eyes moving along the lines of print in a series of rapid jerks. Only one of these

images can be recalled at one time, but, of course, the power of recalling a long series of word images in correct order will vary enormously in different individuals. Galton, quoted by Bastian, says of visuals: "They read words off usually as from a long strip of paper." This appears to me to be precisely the kind of way in which the visual images of words are usually recalled, and to apply equally to people who could not justly be classed as "visuals." The difficulty which we experience in spelling words backwards shows that we cannot readily picture entire word images, but that we mentally construct the visual images of words as we see them, viz. from left to right and by a succession of images.

There is naturally the closest connection between the visual word centre and the graphic centre. Learning to write presupposes the ability to read written characters. If we suppose that the visual image of the letters has to be conjured up in the act of writing, then destruction of the visual word centre must cause agraphia. In this connection it is well to bear in mind a view expressed by Bastian that, in an "auditive" much accustomed to writing, the stimulus to the graphic centre may pass direct from the auditory word centre to the graphic centre. Such a patient would, if this view be correct, be able to write after destruction of the visual word centre, though of course he could not read his own writing. In people who write fluently the visual image of the letters is not at all prominent in the act of writing. Most people, too, are more familiar with printed than with written characters, and the visual image of a word tends rather to appear in print than in writing. While in learning to write the visual images of letters are constantly kept before the mind, it seems possible that at a later stage spontaneous writing may be carried out without intervention of the visual word centre.

Cases of word blindness without agraphia—"pure word blindness"—are explained by a sub-cortical lesion so situated as to leave the visual word centre intact, but to cut off its connections with the visual centres in both occipital lobes. Such a lesion is extremely apt to involve also the visual fibres on the left side, and so to cause a right-sided hemianopsia. The well-known diagram of Déjerine shows well how such a lesion acts. The following cases which have recently come

under our observation appear well suited to illustrate different types of word blindness :—



Schematic figure, showing the course of the optic fibres.
(*Wyllie, after Déjerine.*)

C, cuneus ; C C, posterior extremity of corpus callosum ; F 3, Broca's convolution (speech centre); T 1, superior temporo-sphenoidal, or Wernicke's, convolution (auditory word centre); 1 and 1', left and right optic radiations ; 2, fibres connecting left angular gyrus with left cuneus and through the corpus callosum (2' and 2'') with the right cuneus ; a lesion at X cuts these fibres as well as the optic radiation, and therefore causes right lateral homonymous hemianopsia—word blindness—but no agraphia ; 3, fibres connecting angular gyrus with Wernicke's convolution. The straight black line (4) represents the connection between Broca's and Wernicke's convolutions ; the black line bifurcating in front (5) represents the connections of the angular gyrus with the motor region of the left (5') and right (5'') hemispheres.
Lesion at X causing right hemianopsia and pure word blindness.

CASE I. J. C., æt. 61, married, hairdresser, seen at the Eye Infirmary, Cambridge Street, on October 29, 1903. He complained of inability to read, and thought that the sight of the right eye was defective. He had been a healthy man, but six years ago had a severe attack of influenza, and two years ago a second severe illness of the same kind. Three

years ago he started business on his own account, and had various business worries. In July 1903, after having to dismiss a shop assistant, he had what he calls a "shock," and was unconscious. He partially lost the power of the right arm and leg, and was in bed for some weeks. Speech was never interfered with. He has now sufficiently recovered to superintend his business for several hours a day, but readily gets tired. He says he has always been moderate in the use of alcohol, and there is no history pointing to his ever having suffered from syphilis.

State on Examination.—A man of medium height, stout build, and florid complexion. Walks with a decided limp, and uses a stick to support him. Speaks plainly and without hesitation, and is inclined to be talkative. His memory, he says, is not what it was. His mental powers have doubtless been somewhat impaired by his illness, but there are no evident signs of mental weakness. The difficulty in reading was noticed as soon as he tried to read after his last illness.

Examination of the visual fields reveals a typical right lateral hemianopsia. Wernicke's pupillary sign is not present. The shadow test shows a hypermetropia of about 3 D in each eye. The fundi are normal. When tested with Snellen's type (after correction of his hypermetropia), he can read only two or three of the letters on the scale, and that independent of size. By the illiterate type his vision in each eye is found to exceed $\frac{4}{12}$. He can name correctly most of the numerals on the Maddox scale (5 metres), but confuses 8 and 7. Some of the composite numbers on the scale are also read correctly, *e.g.* 20, 34. With suitable correcting glasses he cannot read a word of the Jaeger type for testing near vision. If the words are spelt for him he can at once pronounce and understand them.

He is able to calculate fairly well if the numbers given are simple. He sometimes fails with the multiplication table, *e.g.* 9 × 8, and is sometimes puzzled by simple addition, *e.g.* 37 + 9. He states that he got a prize for arithmetic at school.

He spells simple words correctly, but admits that he was never a "great scholar." He used, however, to read a great deal (newspapers and books from a library), and finds the want of reading a great privation.

He never was able to read music.

His power of writing is found to be almost lost. Doubtless the slight rigidity of the right arm and hand may to a slight extent have increased his difficulty, but in addition the inability to recall the form of many of the letters is very evident. His name is written fairly easily and legibly. His address is also legible, though several of the letters are quite wrongly formed. His wife's name is almost illegible. With a great effort a few simple words are written fairly well to dictation, *e.g.* "war, Japan, pen." The name "Paterson" is written almost as readily as his own name, and this is probablv explained by the fact that the foreman in his shop bore that name, and that patient was constantly in the habit of writing the word in his account books.

Numbers are written down to dictation much more easily and correctly than words, even such numbers as 24, 100, 149, etc., being almost always correctly written.

When pressed to write something spontaneously, he produced on two occasions almost identical sentences, written very badly, "I want to see you to-night"; and on the second trial, four months later, "I want to meet you to-night." He appeared rather proud of this feat, saying the words just came into his head.

He is quite unable to read what he has written after a short interval. His signature he always recognised, but sometimes not until he had studied it for some time.

He did not appear to be assisted in reading a letter by tracing it over with his fingers. His name was written fairly well with his eyes shut. He is unable to copy writing except in the most laborious and clumsy fashion. A word printed in capital letters he copied as print, and had considerable difficulty in imitating the various letters.

Faces and familiar objects have always been recognised perfectly well. A general examination of his nervous system showed only the remains of a right hemiplegia, there being considerable stiffness of the right leg and a slighter disability in the arm. Sensation appeared normal.

His condition has altered very little since he was first seen. He has studied a child's primer, but not with any persistence. He can name most of the letters of the alphabet at sight, and recognises a few words, such as "of, to, an," etc.

The case illustrates well a severe type of lesion giving rise to very definite symptoms, viz. right-sided hemianopsia and partial hemiplegia, almost complete letter and word blindness, and great interference with the power of writing. The preservation of good intelligence and the entire absence of speech defects are noteworthy. The presence of hemiplegic symptoms and the involvement of the visual word centre seem here to point to a cortical softening over part of the area supplied by the left middle cerebral artery. To explain the hemianopsia we must suppose that the lesion has penetrated deeply enough to affect the radiations of Gratiolet.

CASE II. Miss A., æt. 70, seen November 10, 1904. Complains of difficulty in reading, and thinks her sight must be failing.

She enjoyed excellent health till a year ago, when she had a very severe fall. Since then she has not felt so strong, and has been subject to headache. The difficulty with reading has only existed for about a month. The patient is a well-educated and highly intelligent old lady, accustomed to read and write a great deal.

Visual tests showed the vision to be good in both eyes. R.V. $c + 1.5$ D $= \frac{5}{7}$ slowly; L.V. $c + 1$ D and $+ 0.5$ cyl. axis vertl. = do. With both eyes open and correcting glasses, V. $= \frac{5}{6}$ partly.

The examination of the visual fields shows a right hemianopsia. The inner half of the field of the left eye is not quite so completely gone as the outer half of the field of the right eye.

With suitable glasses for near vision the difficulty in reading is found to depend on an inability to recognise many of the words seen. When left to herself she spells over the words which she cannot read at sight, and at once names the word. The numbers on the Maddox scale she reads easily, but an exhaustive trial of her ability to read more complex numbers was not made. She says she finds some difficulty in expressing herself when speaking, and is apt to forget names of places and things. This is not noticeable in her conversation, and on trial she named objects shown her quite readily. Her friends,

however, state that her memory and general intellectual activities seem to have failed during the past few weeks.

She writes fluently to dictation, but says she finds some difficulty in expressing herself in writing. On the previous day she found the greatest difficulty in writing on a postcard the hour of an appointment.

Dr Byrom Bramwell was kind enough to see this patient subsequently, and reported that, apart from the partial word blindness and the defect in the visual fields, examination of the nervous system revealed nothing noteworthy. He was inclined to ascribe the symptoms to a thrombosis of the left posterior cerebral.

The visual word centre appears here to have been left intact, while its connections with the visual centres in the occipital lobes have been interfered with, though not completely interrupted. (Since writing this I have been informed that this patient has recently developed signs of a spreading of the thrombotic process to other areas of the cortex. Right hemiplegia and a very marked speech defect have been prominent symptoms.)

CASE III. Mrs R., æt. 41, seen April 29, 1905. Complains of difficulty in reading, and of not seeing objects to her right side.

Had a congenital cataract of the left eye removed by needling 13 years ago. Four years ago, when one of her children was born, she had a very severe illness, described as a "kind of shock." She recovered slowly, and since her illness has always had difficulty with reading. The hemianopsia was noticed shortly after her illness, when she was seen by an oculist. Two years ago had fits, affecting chiefly the right side, and apparently Jacksonian in type. During convalescence from her first illness a slight degree of mind blindness seems to have existed. She states that for some time she never felt sure of recognising her friends, and felt mentally confused and depressed.

Present Condition.—L. eye shows a fairly dense film in pupillary area and tends to diverge; V = fingers counted close to the eye. R. eye appears normal. R.V. $c + 1.5$ D $= \frac{5}{6} +$ with slight hesitation; F. normal. On testing fields to hand movements a right hemianopsia is found to be present.

Tested with the near vision type, she can decipher the smallest

type with ease. She cannot, however, continue reading for any length of time, and the size or distinctness of the type makes no difference. She will read a few words or a short sentence well, then a word will be misnamed, or she will stop at a word and have to spell it out before she can go on. The effort of attempting to read she declares to be so exhausting that she cannot persevere in her attempts to read even a few sentences. The condition present is thus a dyslexia rather than an alexia.

Simple numbers she can read easily; a complex number, *e.g.* 111359, appeared to perplex her, but she was inclined to attribute this to a natural distaste for arithmetic.

She writes fluently, and is accustomed to write long letters, but says she cannot read what she has written any better than she can read a book.

She used to read music very readily. Now she cannot read even simple music with any fluency, though she can recognise the individual notes. She can still play familiar music from memory, and her musical ear is as good as ever.

This case appears to me analogous to those cases of dyslexia first described by Berlin. The explanation given of the symptoms, and it seems quite a probable one, is that there is an interruption in the conducting paths between the visual centres and the visual word centre. In the case before us the history and the presence of a hemianopsia show that a severe organic lesion exists, most probably in the left occipital lobe, In several of Berlin's cases the dyslexia existed along with evidence of severe cerebral disease, while in other cases the dyslexia appeared as an initial symptom, which, however, was apt to be succeeded by more serious developments.

Hinshelwood records a case in which the dyslexia appeared to be due to chronic alcoholism, and in which complete recovery took place.

In the case I have described, no detailed examination of the nervous system could be made, as the patient was only seen on one occasion. There was, however, no obvious motor or sensory impairment. The patient seemed in good health, but said she was very nervous and easily tired. She complained especially of extreme nervousness when she had to meet a number of people, as at any entertainment or social gathering.

THE ONSET OF FEAR AND THE ONSET OF PAIN IN CARDIAC DISTURBANCE [1]

By GEORGE R. WILSON, M.D.,
Medical Superintendent, Mavisbank Asylum

MR PRESIDENT AND GENTLEMEN,—I wish, at the outset, to make clear the purport of this paper, and to explain what I do not venture to discuss; for, in addressing this Society, the majority of whose members have a much more familiar acquaintance with cardiac disease than I have, one might seem to be stepping beyond one's province.

It is impossible for me to add anything definite to the neurology of our subject. The subjective symptoms of cardiac disturbance are too complex and too subtle to admit of dogmatic teaching. The cortex does not lend itself to the demonstration of its mechanisms, whether by an experimental or by a pathological method, as some of the spinal and peripheral mechanisms do. Yet I wish to insist that, though phenomenal proof of cortical processes is impossible, the method of explanation by inference is of equal value. We are apt to attach too great importance to things that we can see and handle, and apt to forget the importance of mechanisms too refined and too complex for the laboratory method. And so, when we try to arrive at a satisfactory account of cortical processes which are implied in such experiences as fears and pains, it may be that we shall throw some light on the mechanisms of the lower realms whose activities eventuate in consciousness.

It is, however, a somewhat forlorn hope that from conjectures concerning cortical processes we can derive any valuable inference about the paths by which "visceral sensations" have come. A much more promising enterprise is to try to assimilate the explanations of so-called "mental" and so-called "bodily" symptoms. It has for long been a grievance of specialists in Insanity that, in the mind of the general physician, there is an estrangement between those two groups of symptoms. It is not that the mental symptoms have been ignored—many observers have recorded the mental facts in

[1] Read before the Medico-Chirurgical Society of Edinburgh.

bodily diseases—but it still seems true that, when physicians meet with a mental symptom, their idea of the nervous process is more or less different from their idea of what happens, say, in a case of locomotor ataxia or in one of diffuse sclerosis.

The primary idea, which we must realise and always maintain, concerns the continuity of nerve-processes, no matter whether they have an effect in consciousness or not. We may state this as a law:—Every impulse, from the skin surface, from special sense organs, from muscles or from viscera, initiates a series of continuous nervous activities, which must be thought of in terms of physics, no matter whether it does or does not result in a mechanical effect, such as a muscular reaction; or in a visceral effect, such as a secretion; or in a conscious effect, such as a sensation, idea, or purpose.

The important part of that proposition is the insistence on the continuity of nervous activities. We are apt to imagine that when an activity becomes "mental" its nature is thereby changed, that the conscious process has interfered with the physical in some transcendental sense. That some interference occurs in the cortical neurons is certain, but that interference is to be explained in exactly the same terms as must be employed in connection with visceral and sensori-motor mechanisms. Wherever the neuron may occur, the nerve-current may suffer a change of direction. Sometimes it is projected in an almost direct route, sometimes deflected, sometimes reflected. I shall revert to this later in discussing the accepted explanation of "referred pains."

Meanwhile I shall recount very briefly some symptoms in a few cardiac cases which seem pertinent.

The first and the second patients came to me on the same day expressing an identical fear—a dread of injuring the mother. This somewhat dramatic coincidence started the enquiry which is the subject of this paper. I shall endeavour to leave out irrelevant details, and furnish you only with facts which seem to be essential.

CASE I. An elderly widow, the daughter of a widow still alive, suffered from mitral incompetence. She complains that, not infrequently, in the early hours of the morning, she awakes

in panic and becomes afraid that she will do some injury to her mother. The dread soon passes, and she goes to sleep again, or regains assurance enough to rise and dress. This is the only case in the series in which there is a valvular lesion. The patient had suffered much in earlier years from palpitation and from a "sinking sensation," sometimes thoracic, sometimes general, to which we shall revert.

CASE II. An adolescent case, an anæmic girl, complains that she awakes in panic and becomes afraid that she will do some injury to her mother. There is no organic disease of the heart, but its action is weak and irregular.

Before proceeding to some other cases, it is well to remark here that these were the only two patients who suffered a severe cortical crisis. Both were on the eve of their discharge from the asylum. Both had recovered from an attack of mania. More important, perhaps, it is to note that, in both cases, the "referred fear" concerned their most important relation in life. The mother was everything to each of them. That relation constitutes what we may call a "tender area" in the mind, a hypersensitive area in the cortex. You will find that this is the case in most of these paroxysmal fears, that the patient refers his dread to some subject which has been much in his mind of late.

CASE III. A middle-aged man from the north—a grocer, a baker, a tailor and clothier, a farmer, and a druggist in one—had a large and successful business from which he rarely took a holiday, and was a keen money-maker, though a generous friend. He was in a condition of general nervous irritability, suffered insomnia and anorexia, and there was some cardiac dilatation, displacement outward of the apex beat, a very thumping action, so that you see the impulse easily through his clothes, and there was marked arhythmia. He had frequent paroxysms of fear, mostly at night, and his dread usually was either that he had made a mistake in dispensing and had poisoned someone, or that he had made a mistake in filling in the amount of a cheque. In the latter instance it was an overpayment that he dreaded.

CASE IV. Another man of about the same age, also in business, gambled with and lost some trust funds, and took to slightly excessive drinking. He had frequent night terrors, the dread at first being a dread of exposure, but latterly lest he should cut his throat, and this became so frequent and distressing that he kept his razors away from the room in which he slept.

CASE V. These sudden fears are common in alcoholic cases, and, of course, tobacco is also a frequent factor in the cardiac disturbance of such patients. One young man has suffered more from this symptom than any one I know. "Night after night," to use his own words, "I awake in an agony of terror, trembling so that the bed shakes, and bathed in perspiration." At first he had no particular dread, but "just a nameless horror"; more recently he has developed the fear, in such paroxysms, that he is going to have D.T. I have seen this patient in a paroxysm of fear by day which lasted nearly an hour. His fear then was that he was going to die. His pulse was very variable in its rhythm, on the whole slower than usual, and sudden and short and soft. As the heart resumed a more even and stronger action the terror passed.

CASE VI. Another such patient suffered badly in a similar way. Waking in terror in the night, or early morning, trembling and perspiring, he formulated his dread lest his employers should discover his delinquencies and dismiss him; and, as he was a man of some public importance, the disgrace of such an event appealed to him as an awful menace. You will find this symptom and this specific fear—the fear of exposure and humiliation—frequently in your cases of alcohol and tobacco poisoning. And, let me repeat, I am not talking of the habitual dread which all drunkards, who recognise that they are drunkards, have, but of a paroxysmal incident, an event of sudden occurrence and short, with marked bodily discomfort, usually trembling and perspiration and the "sinking sensation," and with extreme, though brief distress; a state of panic in which the mind fixes on what seems the most likely excuse for its apprehension.

CASE VII. Another lady, not alcoholic, who had a curious arhythmia, associated with neurasthenia—her pulse intermitted about once in 70 beats, and the intermission was usually followed by a few hurried impulses; but she had no organic lesion that either her own doctor or I could discover—this lady frequently awoke in the morning in a state of panic, and in her case the fear was lest she should not be able to rise.

CASE VIII. I am persuaded that cardiac disturbance is often an important factor in the night terrors of children, though it is likely that there must be a neurotic habit to begin with, and that the cardiac upset is a reflex effect of digestive disturbance. In the case of a boy who was put under my care this was certainly the case. He had come from the country, and was living in an Edinburgh hotel, taking less than usual open-air exercise, and eating much more than usual rich food. On several nights he suffered panic, and, as is common in such cases, he could not be aroused and brought to full consciousness. He screamed in his terror, shouting for help because there were burglars, and failed to recognise his mother, or his sister, or me. I watched that boy's pulse frequently and carefully, and there was marked arhythmia of the type which I think is commonest in those cases to which I refer. I shall revert to it presently. I have no doubt that, in his case, the cardiac disturbance proceeded from digestive disorder. And, though it may not seem to have a direct bearing on our subject, I think you may find it instructive to learn that this boy's sister, who was a patient of mine for a long time on account of habit-spasms, had a heart of most irregular action. I cite her case only to suggest a collateral import. Notwithstanding her cardiac arhythmia, her habit-spasms became steadily less under a strict regime in which the diet was very carefully supervised and in which spells of rest alternated with spells of activity, the latter partly systematised and partly spontaneous. On one occasion this girl was taken to London and lived in a fashionable hotel, spent a considerable part of her day in cabs, ate indiscriminately, neglected her exercises, and suffered an acute attack of gout in the big toe. I repeat that these cases suggest a collateral import—one, a girl with a constantly irregular heart and habit-spasms and an acute gout,

the brother with a regular heart having a paroxysmal arhythmia with night-terrors.

These cases, with their various referred fears, are enough, I think, to illustrate the group of symptoms which I wish to compare with referred pains. In all of these cases the cardiac disturbance was, in my opinion, the factor of primary importance. But I do not suggest that this is always so. Similar symptoms may occur in connection with other visceral disturbances, and especially, perhaps, in disorders of blood. Yet I think you will find that, in most, if not in all, cases of transient terror, the cardiac activity is importantly involved.

I reserve until later a case which seems singularly instructive—a synthetic case, suggesting a diffusion of impulse in cortical areas with a "reference" to somatic areas usually associated with activities of the spinal cord.

It is, I think, convenient at this stage to discuss what the cardiac condition is which seems to be the occasion of these disturbances. As I have told you, I have, I think, only seen one case in which paroxysmal fear was associated with a valvular lesion. No doubt, many here present, who have infinitely more opportunity of such observation than I have, could recount a number of such cases. And yet I am not sure; for my impression is—and it is no more than an impression—that the occasion of irrelevant, paroxysmal terror is a mode of heart's action which occurs as commonly in what are called nervous affections of the heart as in valvular disease. As we all know, a pulse may be flagrantly irregular, with no two beats of equal force, and intermittent, and yet, if this irregularity is a constant irregularity, the patient's nervous system apparently adjusts itself to the malady, and no psychical disturbance need supervene. But in three cases which I have described, and in which I have happened to be able to follow the pulse during a paroxysmal panic, the arhythmia was unusual; that is, the patient was not accustomed to the irregularity, for the irregularity itself was paroxysmal.

The mode of the heart's action which I believe to be most disturbing to the patient is one in which the contractions, for a short time, and only occasionally, are either quickened or

slowed, or both alternately, so that you get an arhythmia comparable to the arhythmia of organic heart disease but occurring very incidentally, say for not more than one hour in the twenty-four. I may add—and this again is a mere impression gathered from the observation of a few cases—that alarm follows more readily upon inhibitory than upon augmentor interference. That sounds natural — that you should be alarmed when your heart goes slow; but anyone who studies the question must know that an interference with the augmentor function is of as serious an import as an inhibitory disturbance; and if, as I conjecture, panic occurs most commonly in cases of inhibition, the fact raises one of several questions concerning the subjective effects of cardiac arhythmia upon which it is interesting to speculate. It is a suggestion almost too simple to be true, that, while excessive impulses by the augmentor route, passing by the sympathetic chain to the spinal segments and upwards to the cortex, are eventually distributed to areas which represent surface pain, there are other cases in which the excessive inhibitory impulses, which travel by the vagus and evade the dorsal segments, are distributed to mechanisms which represent fears, dreams, sinking sensations, flushings, etc., etc. (It is useful as a means of assimilating mental and bodily symptoms to think and speak of the "distribution" of fear. When we speak of the distribution of pain, we imply both a physical and a psychical process —the distribution of a nervous activity and the distribution of a mental activity. Exactly the same coincidence of the two processes should be assumed in cases of fear.)

I wish to revert in passing to two other kinds of nervous symptoms before coming to "referred pains." These are nightmares, or alarming dreams, and what patients call a "sinking sensation." I do not venture to suggest that this class of four varieties of nervous disturbance—paroxysmal terror, nightmare, sinking sensation, and referred pain—have the same pathological significance. But I do venture to suggest that they are analogous; that they form a group (and perhaps we shall add other symptoms to the group); and that anything we can conjecture about any one of them will certainly contribute to our conjectures about the rest. And I use the word "conjecture" advisedly, for, by the nature of the case

we cannot arrive at certainty in the scientific sense of the term. But I ask you to bear in mind what I have already said, that there are some things in neurology and in psychology which we can infer although we cannot demonstrate them; and that that certainty has a value, or should have a value, in the logic of science, which is no less than the value of the certainties of anatomy and of histology.

I cite only one instance of nightmare, and in the use of that term I crave some licence. By nightmare let us mean a dream associated with fear, and by fear let us include the whole gamut from vague apprehension to absolute terror. The instance I would quote is, I think, likely to become classical. It is given by Sir Arthur Mitchell in "Dreaming, Laughing, and Blushing." Sir William Gairdner, in crossing the Atlantic, awoke early one morning when in mid-ocean, with something of a start, reading a telegram presumably from home: "Miss Dorothea died at——" all the rest being blurred and indistinct. He did not suffer terror or panic, but that he was at least vaguely apprehensive is proved by two facts: that he could not go to sleep again; and that, on arriving at New York, he cabled home to learn news of his daughter. The news, as we all know, was satisfactory. But I think that there is a great probability, though Sir Arthur does not suggest it, that the dream disturbance had an important cardiac relation and was in fact essentially a cardiac affair.

Concerning the symptom which is commonly spoken of as a sinking sensation, I have little to say. I merely wish to associate it with those others. The first case I cited—the elderly widow who was afraid she would hurt her mother—suffered grievously at one time from this symptom. She and other patients have made me come to the conclusion that "sinking" in one sense or another is an extremely frequent occurrence in cardiac arhythmia. Sometimes the patient feels that his whole body is sinking, and he naturally wonders how far he will go; at other times, and more frequently, the patient has a feeling as if the viscera were sinking from beneath his diaphragm and leaving a vacuum in the thorax. We should note that this is the counterpart of what many patients in angina pectoris experience—the sense that there is not room in the chest cavity to hold everything, and that the tension is

so great that unless relief comes there will certainly be a rupture. Concerning the "sinking sensation," I would put two questions: (1) Is this feeling of sinking associated, in an important degree, with cardiac inhibition? and (2) are these two forms of ill-feeling suggested by a sense of sinking—the one a thoracic and the other a general sensation—capable of a common explanation?

And now, concerning the onset of pain in cardiac disorder, I wish to say something. The literature of the subject is more than ample, and Dr Gibson[1] has presented us with a useful summary of it. I need only remind you of these salient points —that in angina pectoris the patient may experience very various forms of pain—a pain at the heart, a præcordial pain, a cephalic pain, a scapular pain, a pain about the collar bone, a pain about the shoulder, and thence afield, in wider radiation, a pain in the arm, abdomen, testicle, thigh, or toe, or elsewhere. These pains obviously vary in their relevance. The pain about the heart is a relevant pain; the pains elsewhere demonstrate varying degrees of irrelevance. Just in passing I would remark that this term "referred pain" seems poor, because every pain, from that of a sprained ankle to that of, say, a megrim, is referred to some more or less definite area. "Irrelevant," therefore, seems to me more descriptive than "referred." But that is by the way. More important is it for us to consider how these manifold symptoms to which I have alluded come about. What is the nervous mechanism which determines, in cardiac cases, that one patient shall have an irrelevant fear and another an irrelevant pain? I would suggest that in all these cases of cardiac upset there is a general sense of ill-being which has not had the attention it deserves. Even if you confine your attention to alarming dreams, the sinking sensation, or to so-called "referred" pains, it is clear that fear, in some degree, enters into each. I propose, therefore, to suggest some explanation of the mechanism of irrelevant fears in cardiac cases in the hope that any such suggestion may contribute to our conjectures concerning the other symptoms alluded to.

In the first place, we may assume, in most of the cases such as I have cited, a predisposing "tender" area. I use the

[1] "Nervous Affections of the Heart," ed. 1904.

phrase only to assimilate our thinking of mental symptoms to our thinking of bodily. Dr Head,[1] in his classical contribution to this subject, has fully described the surface areas in which tenderness occurs, and has shown that these areas coincide approximately with the areas in which referred pains occur. It is not, and probably never will be, possible to localise hypersensitive areas in the cortex; but they certainly occur. Every patient who is at all seriously ill, whether from cardiac or other disease, and who yet retains a fair measure of consciousness, develops tender, *i.e.* hypersensitive, cortical areas. These are known in consciousness as recurrent suggestions. In later stages, if the cortex breaks down, these suggestions become obsessions. But the first thing to note, in accounting for irrelevant paroxysmal fears, is that there has been a predisposing hyper-activity in certain areas. In many cases the development may be purely functional, as when a daughter dotes upon her mother or a man upon his affairs. In other cases it may be that by some chance of vascular supply, or by morbid deposits, a cortical area acquires either an excess or a defect of sensibility, and that thereby the nerve-movement of a critical moment is deflected.

The first conscious thing that occurs in a cardiac crisis, whether it result in pain or in fear, is a vague systemic sensation. I wish to insist upon this, because it seems vital to our understanding of the route followed by the nerve-currents. Not enough attention has been paid to this systemic function—the mechanism by which we have a general sense of ill-being or of well-being. It is an all-important function, and almost constantly in operation. This is not the occasion to labour the point, but it seems certain that every disturbing stimulus immediately reaches the systemic mechanism. We must therefore assign to it a central place in our explanation both of the psychology and the neurology of pain and of fear.

When we try to explain the route followed by a nervous activity in crises such as we are now discussing, we almost invariably conceive of them much too simply. It is the fallacy of anatomy and histology that we incline to think of a current as passing, say, from the cardiac plexus to the medulla—by the

[1] "On Disturbance of Sensation, with special reference to the Pain of Visceral Disease," *Brain*, vol. xvi. p. 1, and vol. xvii. p. 339.

sympathetic or by the Vagus route—and back again to the cardiac mechanisms; or that the current is deflected by the hypersensitive elements of a dorsal segment. It seems more likely to be true that there is an immediate and continuous circulation of nerve-movement along well-organised reflex routes, also through projected routes (sensori-motor, etc.), and that, meanwhile, other currents, deflected or diffused by less differentiated mechanisms, confuse the issue. It seems certain that the reflex from vital viscera to this mechanism of systemic sensation is well organised, and very facile, though we cannot demonstrate it. Before you place a pain, and after you have placed it, you are aware of something wrong; and before you assign a fear, and after you have assigned it, you are aware of something wrong.

The next stage in the conscious process is the attempt to find out what is wrong—a discriminating mode of attention for which we must assume another (efferent) path; and, in the case of fears, this activity is usually distributed to mechanisms which, by wont and use, are disproportionately susceptible. It is probable that, on arrival at the cortex, there is a wide diffusion of the nerve-current, in proportion to the strength of the afferent stimulus. This brings into prominence—rivets the attention upon—some "tender" subject, and thereupon ensues what appears to the patient to be a rational process by which he justifies his fear. Meanwhile, I repeat, activity continues in the systemic mechanism, and a to-and-fro movement between cortex and cardiac plexus. Without the last we cannot explain what undoubtedly occurs in such cases—a reflex effect upon the cardiac action coincident with the various phases of the conscious content.

Head's explanation of referred pains is very convincing so long as he confines himself to the spinal and sympathetic reactions. It is with deference that one ventures to criticise such an authority. But when he comes to psychology he seems to fall a prey to the fallacy of the habit I complained of at the outset—that of laying aside terms of neurology in explaining the more complex cortical processes. The spirit is regarded as a kind of *diabolus ex machina*, and there is no knowing what the devil the devil will do with a misguided visceral impulse. Here are some quotations from Head's contribution first cited (*Brain*,

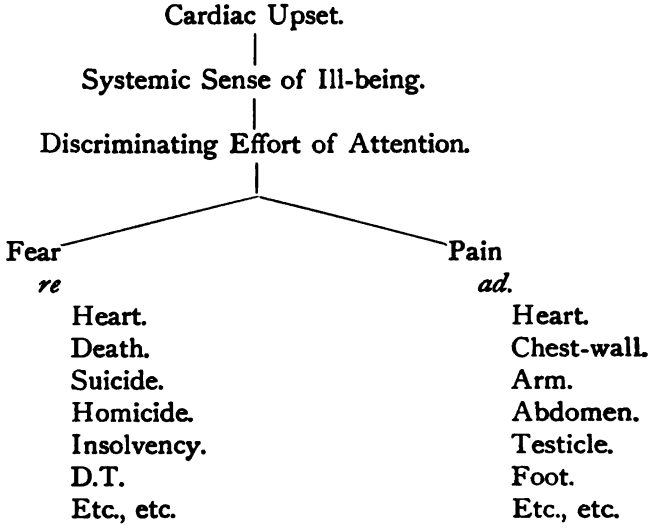
vol. xvi. pp. 124-126), and I think I do them no injustice in extracting them from their context. "In all such cases of wrong localisation, the particular sensation which is wrongly localised must be diminished, and must not be absolutely lost over the affected area. If the power of perceiving this stimulus is totally lost, the stimulus is simply not perceived. . . . Now, the localisation of sensation is not a physical, but a psychical phenomenon. It is not a question of the number of rods and cones, or of the number of nerve-end-organs, but is a phenomenon of association. Thus, supposing a prick was so applied that it just stimulated one nerve-end-organ, this stimulus so caused would pass up one fibre, and probably remain distinct all up the cord. But in consciousness the final result of this stimulus appears as a disturbance in the psychical field over a wide area" (mechanisms of systemic sensation?) "with its maximum at one point representing the psychical unit, which corresponded to the part stimulated. . . . But . . . the psychical effect produced by the area of diffusion may be even in excess of that representing the point of stimulation. . . . Under such conditions the position of the stimulation will no longer be localised at the point stimulated, but somewhere in the area of diffusion" (a tender spot). And later: "A painful stimulus to an internal organ is conducted to that segment of the cord from which its sensory nerves are given off. There it comes into close connection with the fibres for painful sensation from the surface of the body, which also arose from the same segment. But the sensory and localising power of the surface of the body is enormously in excess of that of the viscera, and thus, by what might be called a psychical error of judgment, the diffusion area is accepted by consciousness, and the pain is referred on to the surface of the body, instead of on to the organ actually affected. I do not mean to state that pain is never referred to the organ affected. Far from it. The pain is frequently felt in the organ itself, but it is 'dull,' 'heavy,' 'wearing,' and not 'sharp,' 'aching,' 'stabbing,' like referred pain."

Here, I think, is confusion in not sticking closely to a neurological conception. The localisation of pain, for our purpose, is altogether physical. From first to last it is a nerve movement. It is not a phenomenon of association, but a

phenomenon of nerve connections. The mistake arises not by "a psychical error of judgment," but by a deflection in the tender areas of the cord or of the cortex. By all means let us discuss psychology, but let us not mix up the two coincident processes. I commit no error of judgment if I refer a pain to my arm which "ought" to have been referred to my heart. I form a perfectly sound judgment on the information supplied, but the message I receive has been tampered with in the transmission. In the nervous process it is obviously not the cortical mechanisms which are at fault, but the dorsal segments. These have deflected the nerve current into the paths for surface sensation, or have so augmented the activities of that route as to have precisely the effect on the cortex that would result from some painful stimulus applied to the skin surface. Suppose that a man's cortex is developed by an understanding of this subject, what happens? When the cardiac upset occurs he feels, let us suppose, this said pain in the arm. He may say to himself: "This is exactly as if something were stabbing or bruising my arm, but, of course, I know it is a cardiac affair." He therefore does not apply the remedy to his arm, but treats himself for heart. And, in such a case, what has happened nervously? In the early stages, the same as before, that is, up to the wrong reference of the pain. But, promptly, the stimulus coming from the heart is augmented by stimuli which arrive from his conceptual mechanisms, whose function it is to correct the error caused by the dorsal perversion, and so the cortical mechanisms representing cardiac affairs recover their appropriate intensity. The various routes followed in such a process must be very complex, and anything more than a mere suggestion of what happens in the cortex is likely to prove grossly misleading. The form of "error," however, seems to me very much like what sometimes occurs after amputation of a limb. When a man feels pain in his foot that is in the grave there is no "psychical error of judgment." The error is in the spinal nerves and segments. If the man is in full possession of his senses, he promptly knows that these messages, which are uncommonly suggestive of a foot, are nervous humbugs. In his cortex he has developed, by bitter experience, a "lost leg area," and, for some time, or for all time, that area is very tender. One cannot experience a sense

of great loss without developing an appropriate mechanism. And so, when the stimulus arrives at the foot centre and a "referred pain" occurs, forthwith arrives a stimulus from the "loss" area, which sets the current on the right rails and determines a correct issue.

The parallel between an irrelevant distribution of fear and an irrelevant distribution of pain in such cases may be made clearer by the following table :—



Let us also bear in mind that many people suffer referred pains when they get a fright, as, for instance, a lady who feels a pain in the back of her left hand when she sees one of her children about to fall, or suffers other shock ; and a man who, under similar stimuli, has a sharp pain referred to his perineum.

I have now to refer to what I have called a synthetic case, and I shall recite what seems to me to be the significant facts without any further attempts at theorising.

The patient is a young man of very large dimensions. There is no organic heart disease that either his own doctor or I have discovered. But I sometimes tell him that his heart is too small for his body; it is certainly too small for the demands he makes upon it. Some four or five years ago he incurred syphilis. He has taken alcohol to great excess, not

constantly, but in very heavy bouts, and he always smokes more than enough for two men. Last year on coming in from a round of golf, he had an attack of paroxysmal fear. Sitting in the club-house he became suddenly alarmed and was convinced he was about to die. He said nothing, however, and did nothing but sit still, and in about twenty minutes he recovered. Some time later these paroxysmal attacks became more frequent and assumed a new form. The patient's attention would be aroused, still with a sense of alarm, and he would become aware of a humming sound in his right ear. Later, this paroxysmal disturbance developed mentally into a concrete form and the patient, on being alarmed—and I should have said that at this stage these paroxysms occurred oftenest in bed in the morning—began to hear distinct voices in the right ear. In February and March of this year these symptoms were frequent. I had told him what I thought about them and he knew quite well that the sounds had no existence outside of his own brain. I may add that more grave mental disorder has supervened and the patient is now detained under certificates. That is by the way, though the development of the case is of great practical importance. The supreme interest of the case is that, at an earlier stage in these attacks of fear, during which the patient heard fleeting voices, he was convinced that the sound appealing to his right ear came from some region of his own body. Usually it was from one or other shoulder, but very frequently the sound was referred to the right or left iliac region, occasionally to the scrotum, and infrequently to a foot. I have myself observed this patient bow down his right ear to listen to what was being said in his abdomen. These symptoms, at first incidental, have become chronic. But I do not wish to leave in your minds the fact of the patient's ultimate insanity. This appears to me to be a most suggestive development of symptoms to anyone who is studying irrelevant fears and irrelevant pains in cardiac cases—syphilis, alcoholism, tobacco-poisoning, toxic arhythmia, with occasional paroxysmal brady-cardia, one occasion of terror of imminent death, subsequent occasions of alarm associated with humming in the right ear, then frequent appeals to that ear referred to various regions of his body surface. As I have promised, I make no attempt to explain that sequence of events further than to say that it seems

to me to suggest very plausibly a synthesis between irrelevant fears and irrelevant pains.

In conclusion, I would ask you to dismiss as unimportant any criticism I have tried to make of the neurology of irrelevant pains. I am not competent to explain them, and I do not know anyone who is, because, for one reason, the course and destination of the afferent cardiac fibres is still a matter of opinion. My special aim—my reason for bringing such a subject as this before a meeting such as this—was to augment the plea which we specialists in mental diseases have offered for years, that the general physician should not regard the mental symptoms of his patients as pathologically different from other nervous phenomena such as are referred to peripheral nerves. These symptoms which I have recounted—uneasiness, vague fear, panic, terror, and the specific dreads which follow thereon—are to be thought of in the same terms with bodily pains which we meet with in practice—pains which we describe as neuralgic or neuritic.

Above all, I would press this point that, in taking this view of fears which I have tried to set forth, there is an important therapeutic value. Several patients whose symptoms I have described were obviously relieved—and in some instances the relief was curative—on being told that their fear had no more significance than a pain in a shoulder or in a big toe. And to the patient it matters not whether such a conjecture be true or untrue. We must remember, when we have to treat a case of nervous affection of the heart, that there is a pathological sequence which we can alleviate—nervous irritation, cardiac upset, then more nervous irritation. And anything we can do or say which reduces the general nervousness of the patient will have its due effect—sometimes a curative effect—in reducing the cardiac disturbance.

REVERSAL OF THE PATELLA, WITH NOTES OF A CASE

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THE following instance of this remarkable and extremely unusual dislocation came under my observation at the Glasgow Royal Infirmary.

J. F., aged 33, was admitted May 1903, after having fallen a distance of about 30 feet at a building in course of erection; there were many abrasions about his head and face; he had sustained a compound right Colles' fracture, fracture of the left femur at the middle third, and there was a dirty transverse wound opening into the left knee-joint at the antero-internal aspect; the skin for a considerable distance upwards and downwards from the knee-joint was stripped off the underlying tissues for the whole circumference of the limb.

My house-surgeon, Dr A. B. Ross, reported this to me, and also the fact that there was an outward displacement of the patella, which he could not reduce. It seemed that it was unlikely the limb could be saved, owing to the state of the skin and soft parts, and I obtained the consent of the patient for an amputation, should that prove necessary, before proceeding.

After the patient was anæsthetised, the patella was found lying immediately upon the outer margin of the external condyle, pivoting, as it were, on the outer lip of the trochlea and inclined slightly outwards, but it was absolutely impossible to bring it back to its normal position; and, there being no obvious cause why this should be, I suggested that possibly we had to deal with a case of reversal of the bone, but I was not able to recognise the ridges of the articular surface through the aponeurosis, which was tightly stretched over it. I therefore made an incision through this aponeurosis, and the cartilage covered surface of the patella immediately presented. With a bone hook fixed in that margin of the bone nearer the middle of the joint, and an elevator beneath the other margin, and with the hip flexed, after very great trouble the

bone was ultimately twisted back into its natural position. It was then possible to flex the knee more completely than it had been before the reduction, and it was now found that the external condyle was fractured.

The limb was amputated just above the fracture of the shaft of the femur, and the patient made a good recovery.

The knee-joint was dissected, when it was found that the attachment of the vastus internus had been completely torn off the patella by a vertical and transverse wound, that of the rectus was partially, as was the fibrous expansion from the rectus which is continued on to the ligamentum patellæ. The upper margin of the patella was fractured off from the remainder of the bone and lay loose in the cavity of the joint. The crucial, lateral, and posterior ligaments of the joint were intact. The patella had been rotated ("from without inwards"), so that the internal border had passed backwards; it had been "strapped," so to speak, against the outer border of the external condyle by the tension of the fibrous expansion given from the vastus externus to the capsule of the joint.

This dislocation appears to be one of the very rarest that occurs; as far as I can discover, there are only seven other cases on record, and it is by no means certain that all of these were genuine cases.

Malgaigne (*Gaz. Med.*, 1836, p. 433, and *Memoire*, 1837), who was the first surgeon to classify dislocations of the patella, divided the cases of complete reversal into two varieties: (1) Those from without inwards, where the external margin of the patella passes in front and to the inner side. (2) Those from within outwards, where the external margin passes backwards and to the inner side, the internal border going to the front. Of these two varieties the former appears to be much rarer than the latter. It will be seen that the case now recorded is of this type, but the only others that I can find are the two, seen by Sue and Bruyères respectively, originally mentioned by Malgaigne, who gives only the briefest note of them, and without any reference. It is obvious that Malgaigne himself had doubts as to whether they really were examples of this displacement, for, writing at a later period in his "Traité des Fractures," vol. ii. p. 918, he says: "I had recorded these two cases in my memoir, but without believing them, and supposing

there had been some error in diagnosis. Even to-day I would not admit them to be conclusive . . . but the vertical luxation of M. Payen, in which the patella inclined a little inwards, and another observation of version from within outwards which will be mentioned later" (Castara's case), "oblige me to give account of them, at least as a *pierre d'attente*."

Of the second class—"Rotation from within outwards"—there are these five cases recorded by the following writers:—

Castara (recorded by Malgaigne, "Traité des Fract.," vol. ii. p. 921).—"A young girl, æt. 17, leaning over a table to take a book, bore all her weight on the extended right limb, pressing the outer margin of the patella on the edge of a chair; when suddenly she uttered a cry; the patella was dislocated. M. Castara called at once, found the limb semiflexed, and that it could be replaced only to a very slight degree. The patella, resting by its external margin on the outer and upper side of the trochlea, inclined its internal border outwards, making a projection of 2.5 cm., its articular surface looking forwards and inwards. . . . The surgeon seized the patella by a finger and thumb, and by a simple movement, from behind forwards and without inwards, quietly replaced it. These are all the signs of incomplete dislocation outwards, and M. Castara was himself mistaken at first, but a more careful examination allowed him to recognise, through the skin, the two articular facets of the patella turned forwards. The reduction occurred so slowly that he could follow the procedure, and convince himself that the bone had really undergone a reversal."

Wragg (*Charleston Journal*, 1856, quoted, *Schmidt's Jahrbuch*, 1856, vol. xci. p. 362).—"A negro received a blow on the right knee while engaged in loading a boat. When seen he lay with right knee extended; at the outer side of the knee a sharp edge of bone projected the skin over it, and below this the external condyle could be felt easily: the inner aspect of knee appeared fallen in; the finger recognised the inner margin of the internal condyle on which the inner margin of the patella did not lie. The quadriceps tendon and patellar ligament appeared as tight hard cords. Reduction easy."

Gaulke (*Deutsche Klinik*, 1863, p. 108).—"A girl, æt. 17, fell from a horse and injured her knee so that a very decided deformity was immediately recognisable. She was not seen

by Gaulke till ten days later, when he found the patella lying on the outer condyle, so that the posterior surface looked forwards and inwards. With deep chloroform anæsthesia he tried for two hours to reduce it but failed: next day, with the aid of a carpenter's vice applied to the outer border of the bone, after many attempts he ultimately got the patella to rotate, and it fell with a snap into its natural place. The deformity disappeared and the mobility of the joint was restored."

Faucon (*Bull. de la Soc. de Chirurgie*, vol. xiii., 1887, p. 385).—"A girl, æt. 22, fell while dancing, and another person jumped on to the internal aspect of her right knee. The knee was at first flexed, but during transport became extended. The knee was found to be flattened, and the seat of effusion—the patella was completely turned round 'from within outwards,' and lying on the external aspect of the external condyle: the articular surface could be easily recognised through the skin by its facets. Reduced by rotation between the fingers and thumb, with the knee extended and the hip flexed."

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Voigt ("Inaug. Diss.," Jena, 1889) records a case from Riedel's Klinik:—"A man, æt. 21, had his extended knee caught between a wall and a loaded waggon. The patella was found lying over the outer condyle; its outer border apparently lay backwards, its inner forwards.

Riedel, who saw the patient six weeks after the injury, attempted reduction; but, although the patella could be brought almost to its normal position, it always slipped back again; so he cut down on it, and found 'the patella rotated through 180° . . . with its dorsal surface in direct contact with the external condyle,' the ligamentum patellæ lacerated, and, as its tibial end could not be traced, the bone was excised. The external expansion of the quadriceps was torn, as was the insertion into the upper border." (Voigt does not state in which direction the patella had been rotated).

Method of Production.—Numerous experiments referring to the mode of production of the various dislocations to which the patella is liable have been made by Streubel (*Schmidt's Jahrbuch*, vol. cxxix.), and Meyer (*Arch. klin. Chir.*, vol. xxviii. p. 256). Although Streubel succeeded in producing external dislocations, he never could produce the internal; and except

in one instance, and that in the body of an old emaciated individual, failed to produce a vertical dislocation—only by boring a lever into the patella in this subject was he able to lever it round on to its edge. He concludes from his research that complete reversal can only occur after rupture, on each side, of the capsule of the knee and the extensor expansions; and while he does not deny the possibility of its actual occurrence, for he writes "some cases have certainly been described," he adds, "of these some are so inaccurately described as to be doubtful, and it is uncertain if the others are traumatic." This latter suggestion, however, does not appear to be altogether justified, for pathological dislocations are not reduced with the ease which appears to have characterised the efforts of most of the surgeons who have recorded these cases.

Meyer (*l.c.*), in a most instructive paper, argues that reversal of the patella is the result of the action of two forces, both of which are tangents to the circle of rotation, brought to play upon the margins of the patella; but he admits that the second "force" may be only "an appointed way" or "resistance." He argues that reversal of the patella can only occur when the knee-joint is flexed, as then the patella is placed between the condyles, and their sloping surfaces form a good appointed way or resistance. Meyer believes that when a patella, which has been completely reversed, is found lying in the fossa supratrochlearis, it is a secondary position assumed after the dislocation has occurred; and in support of this contention he quotes two cases in which "partial reversal" ("vertical torsion") of the bone had taken place while the patients were on horseback, and the knees necessarily flexed, though by the time the patients were examined the knees had become extended. He considers that complete reversal results from loss of the resistances, which would maintain the patella in a condition of vertical torsion (namely, the lateral extensions of the quadriceps tendons from each side of the patella and the tension of the superjacent skin). Both of these structures were seriously injured in my case; the skin was burst over and around the knee-joint, and the internal patellar ligament was ruptured, and there may have been an additional favouring factor in the fracture of the shaft of the femur: this, by permitting approxi-

mation of the points of origin and insertion of the quadriceps, possibly might have weakened the stay-like action of the muscle on the patella.

It seems probable that the "steep incline" formed by the outer wall of the trochlear surface of the femur plays a part of some importance in the mechanism of the production of this injury. While this has been specially dwelt upon by Meyer, I wish to point out that its action in this injury was clearly recognised by R. W. Smith, of Dublin, who referred to it in a paper in the *Dublin Quarterly Journal*, 1852, p. 220.

There may be some doubt as to the true nature of the cases recorded by Faucon and Voigt. Although Faucon speaks of his case as one of "complete reversal," Kermisson, in the discussion on the case, drew attention to the want of reference to the fact that the patella was observed to rotate back again during the reduction process, thereby suggesting some doubt as to its true nature.

Voigt speaks of his case as one of "reversal with external displacement." He describes the patella as lying with its dorsal surface against the outer aspect of the femur, and "rotated through 180°," two remarks which are not altogether reconcilable.

Whether these two cases are genuine examples of reversal of the patella it is difficult to say. Stimson, in his work on "Fractures and Dislocations," describes and figures this same displacement as one of the varieties of the "complete external dislocation of the patella," and there is no doubt that it may result in this way. For example, if a patella be simply displaced outwards, it may come to rest in a horizontal position with its internal border pressed against the outer surface of the external condyle. From this position it may rotate through 90°, more or less, either by its internal border rising upwards, in which case the articular surface would come to lie against the outer aspect of the condyle; or by the internal border slipping downwards, when the articular surface would come to be directed outwards. In the former case there could be no possibility of the condition being considered a "reversal"; in the latter it might be, though actually the patella had only rotated 90°; and this truly would be only a case of "external dislocation with vertical torsion." On the other hand, it is

conceivable that the patella might come to be placed in a similar position in a case of complete reversal of the bone if the violence continue, so as to push it over the lip of the trochlea. If this occur, one of several results may probably happen.

I have experimented with an artificial quadriceps-patellar system, composed of several folds of broad elastic webbing, to represent the elastic and contractile muscle, and a rigid band to represent the ligamentum patellae, with a patella fixed between these two. Fixing this apparatus on the articulated bones of a lower limb, and maintaining these extended: if I reverse the patella (1), making its internal border go backwards (Malgaigne's first variety), and then push the patella over the external condyle, it is almost invariably "untwisted" through 90°, as it goes over the lip of the trochlea, and the non-articular surface comes to lie against the condyle; but occasionally the bone is not untwisted, and then comes to lie practically horizontal, with its articular surface directed forwards: but if the bones of the limb be placed in a position of flexion at the knee, I have only seen the untwisting of the bone come about. Again, if I reverse the patella (2), making its internal border go forwards (Malgaigne's second variety), and displace the bone outwards, the leg bones being extended on the femur: as it goes over the lip of the trochlea it (*a*) rotates through an additional 45° or so, and comes to lie with the articular surface directed outwards; the patella being rotated through an angle of 220°-235° from the normal position. (*b*) Less often the patella is untwisted 90°, so that its articular surface lies next the condyle; or (*c*), less often still, it sometimes lies horizontal, though still reversed. When the bones are kept flexed at the knee I have only seen (*a*) or (*b*) occur.

This artificial apparatus may not be a perfect representation of the natural quadriceps system, but it possibly has an action which is approximately like that of the real apparatus, which, it must be borne in mind, does not lend itself after death for the illustration of the mechanism of these displacements, owing to its loss of elasticity and contractility.

It is quite certain, I think, that had the patella in my case been displaced only a trifle further outwards, it must have untwisted to some extent, and have come to lie with its dorsal

surface against the outer aspect of the condyle; and the fact that the patella was lying on the lip of the trochlea, with its surface directed to a slight extent obliquely outwards, shows that this "untwisting" had actually commenced.

There is one point which strikes me forcibly in reading over the records of the other cases, and that is the comparative ease with which the patella appears to have been untwisted in most of them in the process of reduction—the reduction having been usually effected by the surgeon's fingers and thumb; and they were all cases without a skin wound: whereas, in my case, where there was a wound over the bone, and a fracture of the femur in addition, with the aid of a bone hook and elevators the reduction was only brought about after great difficulty, so tightly was the bone strapped down against the condyle by the external aponeurotic expansion from the quadriceps.

It is somewhat remarkable that my case is the first instance, so far as I can find, where the injury was compound; and it is apparently the only case where a dissection of the parts was possible: for these reasons I have thought it worth while to place the case on record.

Births and Deaths in Eight of the Principal Towns of Scotland during May 1905

DURING the month of May 1905 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4811 living children, of whom 2448 were males and 2363 females. These births are equivalent to an annual birth-rate of 32.4 per thousand of the estimated population of these towns, a rate which is 3.4 more than that for the previous month, and 2.1 more than that for May 1904. The birth-rate for the month was highest in Leith, 36.4, and lowest in Edinburgh, 26.0. In Glasgow it was 34.4; in Dundee, 34.0; in Greenock, 33.5; in Aberdeen, 32.4; in Paisley, 31.5; and in Perth, 30.0. The number of births registered was 640 more than in the previous month, and 368 more than in May 1904.

Deaths in these eight towns registered during the month amounted to 2779, of whom 1440 were males and 1339 females. These deaths are 333 more than those during April, and 118 more than those registered in May 1904. These deaths are equivalent to an annual death-rate of 18.7 per thousand, a rate

which is 1.7 more than that for April, and 0.5 more than that for May 1904. The death-rate for the month was highest in Glasgow, 20.2, and lowest in Leith, 14.0. In Dundee it was 19.0; in Aberdeen, 18.2; in Edinburgh, 17.7; in Paisley, 17.1; in Perth, 16.5; and in Greenock, 15.6. In Greenock and Perth the death-rate was lower than what it was in the previous month; in the remainder of these towns it was higher than in that month.

Of the 2779 deaths, 1018, or 36.6 per cent., were of children of less than five years old; and 681, or 24.5 per cent., were of persons of over sixty. Compared to those deaths in April, deaths under five were 109 more, and deaths over sixty 76 more.

The deaths were recorded of 561 children of under one year old. This number is 49 more than in April, and 44 more than in May 1904, and is equivalent to an infantile mortality of 133 per thousand births. The infantile mortality for the month was highest in Glasgow and Aberdeen, it being 142 per thousand in both, and lowest in Greenock, where it was 101. In Dundee it was 136; in Perth,130; in Leith, 124; in Edinburgh, 117; and in Paisley, 111. In Edinburgh, Aberdeen, and Perth this rate was lower than it was in April; in the remainder of these towns it was higher than in that month.

The principal epidemic diseases were the cause of 328 deaths during the month. This is 89 more than in April, and 75 more than in May 1904, and is equivalent to an annual death-rate from these causes of 2.2 per thousand. This rate for the month was highest in Glasgow, 3.1, and lowest in Perth, 0.7. In Edinburgh it was 2.0; in Greenock, 1.8; in Paisley, 1.7; in Dundee, 0.9; in Aberdeen, 0.9; and in Leith, 0.9.

There were no deaths from smallpox. Deaths from measles numbered 132, which is 57 more than in April, and 63 more than in May 1904. Deaths from scarlet fever numbered 10, which is 4 more than in the previous month. Deaths from whooping-cough numbered 122; this is 7 more than in April, and 8 more than in May 1904. Deaths from diphtheria numbered 22; from enteric fever, 11; from typhus fever, 3; and from plague, 1. Deaths from diarrhœas numbered 27; this is 13 more than in April, and 4 more than in May 1904.

Deaths from influenza numbered 16; this is 3 fewer than in April, but 1 more than in May 1904.

There were 10 deaths from puerperal septic conditions; from malignant disease, 135, of which 64 were ascribed to carcinoma, 10 to sarcoma, and 61 to cancer not otherwise classified. Deaths from heart disease numbered 251; from apoplexies, 137; from premature birth, 96; and from alcoholism, 7.

Deaths from pneumonia numbered 310, and constituted 11.2 per cent. of the total deaths; while those from bronchitis numbered 171, and constituted 6.2 per cent. of the total deaths. Deaths from pneumonia were 42 more than in April, and 82 more than in May 1904; those from bronchitis were 23 fewer than in April, but 9 more than in May 1904.

Deaths from phthisis numbered 252, and constituted 9.1 per cent. of the total deaths. They were 41 more than in April, but 35 fewer than in May 1904.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

THE ninth meeting was held on June 7—Professor John Chiene, C.B., President, in the chair.

Mr Miles showed four successive cases of acute generalised peritonitis, treated by removal of the appendix and washing out the abdomen.

Mr Caird showed: (1) A man after trephining for extra-dural hæmorrhage. Twitching began seven days after injury. A large clot was removed. (2) A woman after removal of a large gall-stone which had caused intestinal obstruction.

Dr Norman Walker showed a case of molluscum contagiosum which he proposed to treat with X-rays.

Dr Gibson showed a man suffering from ophthalmoplegia. Only the nucleus of the fourth nerve on the left side had escaped, and there was weakness of the left side of the tongue.

Mr Alexis Thomson showed a case of tropical abscess of the liver treated by syphon drainage after the method of Sir Patrick Manson. A catheter was introduced through a cannula and drained into boric acid solution. Discharge was free for three weeks and then gradually diminished.

Mr Miles exhibited specimens of vermiform appendices which he had excised, and a spleen removed for traumatic rupture.

Mr Caird showed a collection of gall-stones and calculi and preparations from a case of suprapubic prostatectomy.

Dr Gibson exhibited a heart showing a combination of mitral and tricuspid stenosis.

The President reported that he had presented a congratulatory address to the Royal Medical and Chirurgical Society on the occasion of its centenary celebration, and had been requested to convey the thanks of that body to the members of the Edinburgh Medico-Chirurgical Society.

It was agreed on the motion of the President that, if arrangements could be made, an address should be presented to the Royal College of Surgeons on the occasion of its fourth centenary celebration.

Dr George R. Wilson read a paper on the Onset of Fear and the Onset of Pain in Cardiac Disturbance which appears on p. 31.

Dr Clouston remarked that more progress in psychiatry might be made if practitioners would note the mental conditions which accompanied bodily disease. They might be vague, but were not indescribable. He thought cardiac disturbance alone was hardly sufficient to cause paroxysmal fear, but that some mental instability was also requisite. The brain might even originate cardiac pain.

Dr Gibson said that afferent impulses from the heart could be traced through the sympathetic system, and as nerves had now been demonstrated in the cerebral vessels, it was not difficult to conceive that these impulses might give rise to altered distribution of blood which would affect cerebration.

Drs MacPherson, Graham Brown, Edwin Bramwell and James Ritchie also discussed the paper.

Dr James read notes of cases of acute cerebro-spinal fever and intoxication occurring recently in Edinburgh and in the surrounding district, clinically resembling forms of epidemic cerebro-spinal meningitis, which will appear next month. Drs James Ritchie and Graham Brown discussed the paper.

Glasgow Obstetrical and Gynæcological Society

THE last ordinary meeting for the session was held on May 24—the President, Dr J. K. Kelly, in the chair. There was a good attendance.

1. Dr John Edgar showed the following specimens, and gave brief notes on the cases:—(*a*) A double ovarian cyst removed from an unmarried lady, whose chief trouble had been difficulty in defæcating. Three tumours (cystic) could be palpated, and the operation revealed a double ovarian growth, the cystic mass being a dermoid, the other a multilocular cyst with two large portions. (*b*) A uterus with tube removed for severe and long-standing suppuration. There had been a large pelvic abscess opened through the posterior fornix last October, and this had emptied and filled repeatedly. She was admitted with pus coming both from the vagina and urethra. Laparotomy showed a great matting of the bowels and pelvic organs, and eventually the uterus was split and removed with two pyosalpinges. (*c*) A

large malignant tumour of the ovary (adeno-carcinoma) removed that day from a patient who was three months pregnant, and who complained of rapidly increasing size of the belly and weakness. On opening the abdomen, 12½ pints of a watery blood-stained fluid were first removed, and then the pregnant uterus was seen with the tumour. The latter, a large malignant growth (? adeno-carcinoma) of the ovary was removed. The other ovary was removed, as there were some tubercles on it. The gravid uterus was left alone.

2. Dr Edgar, who read notes on a case of extra-uterine pregnancy at full time. The patient, a ii-para, was admitted to the Samaritan Hospital in January of this year, with constant abdominal pain, and having passed blood *per rectum* for 14 days. She believed herself to be nine months pregnant. At the second month of gestation severe pain had occurred internally, with vomiting and fainting, and this had recurred twice. At Christmas more labour-like pains occurred, and any feeling of life of the fœtus ceased. The patient seemed very ill; the abdomen was distended to the size of a 7½ months' gestation, and was dull and crepitant. The fœtal limbs could easily be felt. Laparotomy was performed on January 20, and the sac was found adherent to the parietes. When opened, dark, foul-smelling fluid escaped, and a macerated fœtus was extracted. The cord was cut, the soft placenta removed, and the cavity washed out. The sac was stuffed with iodoform gauze. After the operation the patient remained very ill, and fæces escaped by the abdominal wound. After some time a loop of bowel came down to the abdominal wound with a fistula in it, and a colotomy pad was worn with comfort by the patient. The repair of the wound was left over till the general health should improve. This case was discussed by the President and Dr Oliphant.

2. Dr Nigel Stark described a case of inversion of the uterus due to malignant disease. The patient was a multipara of 57, in whom the menopause had occurred at 46. Last November she began to suffer from slight hæmorrhage, but no pain, and this went on for some months, fleshy lumps being sometimes passed. When Dr Stark saw her in January of this year, she was very weak and bloodless, and examination under chloroform revealed a greenish sloughing mass filling the vagina. A portion being clipped off by scissors, it was found that the uterus was almost completely inverted and that it was the seat of a malignant growth, of which some 12 oz. were removed. Attempts at replacement proved futile, and the patient's general condition rendered hysterectomy inadvisable. Reference was made to inversion apart from labour, the commonest cause being sessile

submucous fibroids situated near the fundus. The condition required to be differentiated from polypi and prolapse. Dr Stark showed as fresh specimens: (*a*) a ruptured tube from a case of early ectopic gestation; (*b*) a small multilocular cyst; (*c*) an ovarian dermoid whose contents consisted of gelatinous matter containing many scintillating particles which proved to be cholesterin.

3. Dr J. J. Cameron showed: (*a*) a large fibroid with cystic degeneration; and (*b*) a tumour from a multipara which looked like a myxo-sarcoma, but which proved to be a fibro-myxoma.

4. Dr Munro Kerr exhibited: (*a*) an ovarian cyst with a twisted pedicle; and (*b*) an ectopic gestation removed at the seventh month.

5. Dr Jardine showed a curious whiteish fleshy mass about as large as the palm of the hand, expelled after the placenta, by a patient in the Maternity Hospital. No signs of a blighted ovum could be found, but he thought it might be of the nature of a fleshy mole.

Glasgow Obstetrical and Gynæcological Society, conjointly with the Edinburgh Obstetrical Society

THE joint summer meeting of the above Societies was held in Glasgow on June 21, when Dr Cullingworth of St Thomas's Hospital, the Honorary President of the Glasgow Society, opened a discussion on Secondary Repair of the Perineum. There was a good attendance of Fellows, and the chair was occupied by Dr J. K. Kelly (President of the Glasgow Society). Among those who represented the Edinburgh Society were Dr Brewis (President), and Drs Hart, Barbour, Lackie, Fordyce, Keppie Paterson, Barbour Simpson, etc.

Dr Cullingworth, after thanking the Society very cordially for the honour they had conferred on him in electing him to the position of Honorary President, said that the subject he had selected for speaking on was not one of great profundity nor did it present any new and striking features in gynæcology or obstetrics. It was one, however, of much practical importance, and one to which he had devoted a great deal of thought and on which therefore he thought he had something to say. He traced the history of the operation from the time of Langenbuch's "perineal synthesis" (1854) to that of Emmet, Hegar, and Lawson Tait, the latter of whom, he said, had laid the foundation of all future operations. Reference was made, of course, to

the latter work of Howard Kelly. Certain principles, said Dr Cullingworth, should underlie any operative procedure for the repair of a torn perineum; these were as follows:—

1. The perineum should be restored to its original *size* and *shape*; not unfrequently the repair was, as it were, overdone.

2. Sufficiently large raw surfaces must be brought into apposition to make union practically certain.

3. The site of the operation (*i.e.* risk of infection) required that the edges of the vaginal and rectal flaps should be adjusted by most accurate suturing.

4. Convalescence should be free from pain; this was obtained by including a minimum of skin.

5. The operation should be as simple as possible and should have the effect of completely restoring the control of the bowel.

He followed a modification of Tait's method brought under his notice by Mr Ewart of Manchester many years ago. After the flaps had been dissected up he passed in first a deep buried perineal suture, and then sutured the rectal flap, tying as he went along, and using catgut, as these sutures were not to come out. The vaginal flaps were then united by silk-worm gut, the ends of the gut being left long and tucked into the vagina. The remaining perineal stitches were then inserted. The dressing was very simple—a strip of gauze smeared with vaseline. The catheter was used at first, and the bowels were moved at the end of sixty hours.

The paper was discussed by Drs Berry Hart, Reid, Barbour, Sloan, and N. T. Brewis, and Dr Cullingworth replied.

The two Societies dined thereafter in the Windsor Hotel, among the guests being Mr Henry Clark, Dr Finlayson, Dr D. C. M'Vail, and Dr Barr of Liverpool. The health of the Honorary President was proposed by Dr J. K. Kelly, who made special mention of Dr Cullingworth's work in connection with the Midwives Bill, and with the diminution of puerperal sepsis in private obstetric practice. Dr Cullingworth replied in an interesting speech.

Glasgow Southern Medical Society

THE sixteenth and last ordinary meeting for the present session was held on May 18—the President, Dr Jas. Hamilton, in the chair. There was a good attendance.

Dr John Anderson, Pathologist to the Victoria Infirmary, read a paper dealing with some aspects of splenic enlargement.

With the aid of the lantern, he first demonstrated the anatomy of the organ, and its relation to the other abdominal viscera, using for purposes of topography, the lines suggested by Professor Addison, in which the mesial vertical line ran from the sternal notch to the symphysis pubis, while the central transverse line bisected it at right angles. The method he adopted in studying the precise relations of the organ was to inject the body through the femoral artery, on the day previous to examination, with 10 per cent. formalin. The organ was thus hardened *in situ*.

The methods of physical examination were then detailed, and it was pointed out that the normal spleen lay outside (or to the left of) a line drawn from the left sterno-clavicular joint to the tip of the eleventh rib. In palpating the organ, friction-fremitus due to perisplenitis should be looked for. Dr Anderson then gave an account, illustrated by macroscopic and microscopic slides, of the histology of the organ, calling special attention to the arrangement of the blood-spaces to the arteries and veins, and the special cells met with in the pulp, *e.g.* the corpuscle-carrying and pigment-bearing cells.

In the concluding part of the paper, the speaker treated of the enlargements of the organ in disease, and stated that in 640 autopsies at the Victoria Infirmary, the spleen was enlarged in 130. In 75 of them the enlargement was slight (7-10 per cent.); in 45 it was moderate (10-20 per cent.); while in 10 it was great. Pneumonia caused the increase in size in 20 instances, sepsis in 12, enteric in 1, hepatic disease in 6, and chronic heart and kidney disease in over 40. Dr Anderson classified the enlargements as follows:—

(1) Acute splenic enlargement, as in enteric, pneumonia, pyæmia, etc.

(2) Chronic cases, as in passive congestion secondary to heart and lung disease, hepatic cirrhosis, amyloid changes, malaria, and syphilis.

(3) Enlargements associated with blood-changes of pernicious anæmia, the leukæmias, Hodgkin's disease, and splenic anæmia.

(4) Enlargements due to cysts, tumours, and other conditions of this nature.

Editorial Notes and News

Celebration of the Fourth Centenary of the Royal College of Surgeons of Edinburgh, July 19th, 20th, and 21st, 1905.

THE Royal College of Surgeons of Edinburgh, the earliest chartered surgical corporation in the United Kingdom, is this month about to celebrate the Fourth Centenary of its foundation, dating so far back as 1505. Not only, however, has the College in this way the honour of being the senior surgical corporation, but it has the more substantial merit of being the oldest teaching body of the kind established in these realms. The status it acquired as a governing medical authority on the "Privilegis reullis and statutis contenit in its bill and supplicatioun" being granted, was from the beginning made subservient to this purpose. Commencing its career with definite provisions for the teaching of anatomy, it was not long in adding to them instruction in surgery and other branches of the healing art as well; and for the last four hundred years it has, on true and scientific principles, assiduously and successfully paved the way for the development and advance of rational medicine in the most comprehensive acceptance of the term.

At the period of obtaining from the Town Council of Edinburgh its "seill of cause" and its Charter of Confirmation from King James IV. of Scotland as granted to the "Craftes of Surregenry and Barbouris within the Burgh," no other Surgical Incorporation of its kind existed in these dominions. Any approach to anatomical or surgical teaching, such as might then be found in many of the Continental schools, was here unknown. Generally speaking, the sick and wounded of the burgh found their medical and surgical attendants among mere charlatans and mountebanks; practitioners who, with the exception of some occasional votary drawn from among the monastic and often slavish followers of Galen or Hippocrates, were almost, if not wholly, uneducated; and it was to remedy such a state of matters that our famous College was at that date instituted.

For the first seventy years of its existence no minutes of its proceedings appear to have been preserved, but within the span of that comparatively short period—1505 to 1581—events are chronicled, every one of which might be considered more than notable in the history of any nation. Civil and religious warfare scourged the land; startling crimes, Mary Stuart's sad story, Rizzio's murder, Darnley's strange fate at the Kirk o' Field—almost where our College now stands—had staggered

Edinburgh. The wynds and closes of the town rang with the fierce denunciations of John Knox and the Reformers; Hertford's English hosts had sacked the town and its environs; Flodden had been lost; and beyond our own country stirring events were agitating men's minds. Luther had spoken out and been excommunicated. Queen Elizabeth held England's throne, and Shakespeare, Spenser, Raleigh played their parts. Such were the times, such were some of the events, which lent the greater credit to the founders of our College, when in so distracting an era they inaugurated and developed the grand scheme in memory of which the celebrations of this month will now be held.

It appears unnecessary and would indeed here be out of place to recapitulate at any length the work done and the service rendered by the College in the cause of medical education since that date. The College has long been admitted as the main factor in establishing the great Edinburgh Medical School. On the roll of its Fellows and Licentiates will be found the names of men who have adorned the ranks of medicine and surgery in every quarter of the globe. Up to 1859 the Single Diploma of the College conferred the licence to practise in all the departments of Medicine, Surgery, and Midwifery. At that date and with the view of reducing the number of licensing portals it was withdrawn and replaced by the combined Diploma of the Colleges of Physicians and Surgeons of Edinburgh, known as the Double Qualification. In 1884 this was again superseded by what was called the Triple Qualification, being the further combination of the Diplomas of the Physicians and Surgeons of Edinburgh, with that of the Faculty of Physicians and Surgeons of Glasgow, a qualification which is now more than ever in demand. In 1878, on the passing of the Dentists Act, the College agreed to establish a dental Examination and Diploma; while in 1889, and in conjunction with the College of Physicians of Edinburgh and the Glasgow Faculty, a Diploma in Public Health was added to those already existing. Since its foundation in 1505, many municipal Acts, gifts, and Royal Charters have been ratified in favour of the College, by which additional rights and privileges have been acquired, and its position as an independent and self-governing body, instead of a civic corporation, has been conceded.

It is somewhat interesting to find at this date, the fourth centenary of two such remarkable epochs, one in the ecclesiastical and the other in the medical history of Edinburgh, being synchronously celebrated, namely the Religious Reformation under John Knox and the Medical Reformation concurrent with the founding of the College of Surgeons. As has been

already stated, the celebration of the latter event will be held in Edinburgh on the 19th, 20th, and 21st of July. For that occasion various committees are now actively engaged in making the necessary arrangements. It is expected that on the evening of Wednesday, the 19th, a reception of the Honorary Fellows Elect, by the President and Fellows of the College, will take place at 9.30 P.M. within the College Hall. On Thursday, the 20th, at 11.30 A.M., a commemoration service will be held in St Giles' Cathedral; while the commemoration ceremony, inclusive of the President's address and the conferring of the Honorary Fellowships, has been fixed for the same day at 3 P.M. in the M'Ewan Hall, with an evening reception by the College at 9.30 P.M. On Friday, July 21st, a garden-party will be held in the grounds of George Heriot's Hospital at 3.30 in the afternoon, while the whole festival will be brought to a conclusion with the grand banquet in the Music Hall, George Street, taking place that day at 7 P.M. An historical and descriptive account of the College will be presented as a souvenir of the occasion to the Guests and Fellows attending the celebrations; and it is probable that other congratulatory proceedings may occur in addition to those above mentioned, but for which no definite arrangements have as yet been completed. Such is the programme of the Fourth Centenary Celebration as it now stands.

The Chair of Midwifery, etc.

PROFESSOR SIMPSON'S resignation has naturally aroused much interest in the profession, and the chances of the several aspirants to the Chair are the subject of daily discussion. On these there are naturally many opinions, for while some think the Chair should be the reward of long service in the School, others share the much discussed views of Professor Osler. But there are no two opinions on the question of the division of the Chair. We have heard that it has been stated that the profession is not unanimous on this, but we have not come across any of these shadowy dissentients. There are different views as to how the divorce, or better, separation by mutual consent, should be carried out. Some hold that until £15,000 is forthcoming to endow a Chair of Gynæcology, the present arrangment must continue; but surely this is the position occupied by the fanatical teetotaller, who opposes any reform short of total prohibition. In the first place, there is no necessity to place the teacher of Gynæcology in the Senate. Our own view, very strongly held, is, that he and others in the same position should be given the rank of Extraordinary Professor, but, in the mean-

time, a lectureship would suffice. Everyone whose opinion is worth having, agrees that there ought to be a special teacher of Gynæcology in the University. If it were the case that an inferior class of candidates only would apply for a lectureship, then, clearly, there would be something in the opposing arguments. But everyone knows that that is not the case, the candidates will be the same, whatever be the title.

It is really saddening to the reformer to find the money question blocking the way. A lecturer on Gynæcology would, without putting a finger in the University chest, earn an income which many a famous German Professor might envy; and his existence would not be a deterrent, but a stimulus to the grateful and wealthy patient to come forward with the £15,000. The question is one of enormous importance to the Edinburgh Medical School, and every member of it should use all the influence he has to place the matter in its true perspective before those influential laymen with whom the decision will ultimately lie.

The British Medical Association and Parliament

EVEN if the Government has seriously considered the question of a Redistribution Bill, we do not think it likely that the British Medical Association will be one of the new constituencies. But if some of the extreme Progressives of the Association have their way, it seems likely that such a proposal will be put forward. At the moment they are contented with more modest (!) schemes, and as we do not think their proposals have attracted the attention they deserve, we do our best to give them greater publicity. Here is the scheme adopted by the Council of the Association for presentation to the Representative Meeting at Leicester:—

1. That members whose candidature for Parliament is supported by the profession should recognise responsibility to some organised body representative of the profession.
2. That the organised body should be the British Medical Association.
3. That the British Medical Association should select two gentlemen, one on each side of politics, and arrange as to their becoming candidates at the next General Election.
4. That financial and other support should be given to these candidates by definite grants for election expenses and by approaching voters through the Divisions of the Association.
5. That when the funds of the Association permit of it, the necessary expenditure should be met from the funds of the British Medical Association.
6. That the candidates should be selected as in the scheme for nomination for the General Medical Council.

The restriction to two gentlemen, one on *each* side of politics, suggests that the scheme has been a long time incubating, or

else that the authors have been so engrossed in their work that they are unaware of recent events. We question whether any one could say off-hand how many "sides" of politics there are at present, and though the discussion of rival claims might increase the attendance at the Division Meetings, we question whether the art of Medicine would be advanced by a debate as to whether the support of the Division was to be given to a Whole Hogger, a Retaliator, a Free Fooder, a Liberal Leaguer, a Home Ruler, or an Orangeman. We have heard that the Scottish University constituencies specially commended themselves to some of the medical politicians, and it so happens that there are doctors candidates for both. We can imagine Sir John Tuke's reception of the suggestion that he should "recognise responsibility to the British Medical Association" in acknowledgment of financial and other support, and we cannot even imagine Dr W. R. Smith (member of the Council though he be) signing away his political independence for the mess of pottage of Divisional Support.

For it is in No. 6 that the crowning absurdity lies. Probably most of our readers have forgotten the scheme for nomination to the General Medical Council; for the Scottish Committee wisely decided to have nothing to do with it. Here it is in brief:—

1. Any Division may nominate a candidate or candidates, who must sign a declaration as follows:—

DECLARATION BY CANDIDATES.

I, the undersigned, hereby consent that my name be submitted to the Division of the Association as willing, if duly elected, to be nominated on behalf of the Association as a Candidate at the election in 1906, of Direct Representatives on the General Medical Council for England and Wales. I agree that, if not selected for nomination by the Association, I will not allow myself to be nominated as a Candidate in opposition to any Candidate so elected.

I agree, further, that if nominated by the Association and elected as a Direct Representative on the General Medical Council, I will, in my capacity as such Representative, endeavour in every way in my power to give effect to the wishes and opinions of the British Medical Association as lawfully declared for the time being by the bodies constitutionally authorised to declare such wish and opinions.

Signed.....
Qualifications.....
Address.....

2. The Council shall prepare a list of those nominated, and each Constituency shall be requested to instruct its representative how to vote at the Annual Meeting.

3. At a special sederunt a ballot somewhat on the lines of the American presidential election shall take place, and those finally selected shall be deemed to be the candidates supported by the Association.

4. The Medico-Political Committee shall arrange for nominations, and every effort shall be made by the executive of the Association to secure the election of the said Candidates.

There is no doubt something to be said for the labour member. But we confess we do not care to see the medical profession vying with the miners and the co-operators. These return their members avowedly in the interests of their class, and it seems to us that in any way to suggest that the interests of the medical profession conflict with those of the general community is a grave blunder. Although our profession does not take the prominent part in public life that our French confrères do, we are not unrepresented in Parliament. Of the nine or ten doctors in the House, many have done most useful work, not less useful, we believe, because they were returned not as doctors but as politicians. The member for the British Medical Association would, we fear, be listened to with suspicion when he spoke on medical topics. We believe that when the representatives are told that this scheme is the best the Council can do for them, they will realise that the matter had better be allowed quietly to drop.

The Three Terms Scheme.

OTHER matters have probably dimmed the recollection of this proposal in the minds of those not immediately concerned. But we are glad to learn that it is showing signs of reviving animation, and that at a meeting in Glasgow of representatives from the Courts of the four Scottish Universities the principle was adopted. Unfortunately the hardened reformer is too familiar with proposals of which the principle was adopted, but which were wrecked on the details, to be too sanguine over this apparent conversion. When there are four Universities, each with four or more Faculties, each of them with vested interests and cherished privileges, it is astonishing how many difficulties crop up. Difficulties which to the eye of the outsider seem the merest trifles are magnified in the mind of the person concerned into insuperable obstacles. We question, indeed, whether it will ever be possible to get a general scheme through the four Courts, and are rather inclined to go over to those who hold that the first step in the reform of the curriculums of the Medical Faculties of the Scottish Universities is the dissolution of the bond which unites them all in one entangling alliance. We understand that as the matter stands now there is very nearly agreement among the Medical Faculties, but that other Faculties are not yet converted. To the onlooker it would seem not impossible to allow the

Medical Faculties the freedom they seek: at present the Divinity Faculty has a shorter session than the others: surely no one would be seriously the worse if a week or two were added to the Medical year.

Child Life in Utopia.

THE appalling infantile mortality of our large towns, and the equally appalling conditions under which children are living and surviving, are only beginning to appeal to the imagination and the conscience of the general community. Anyone who knows anything of the facts, however, will admit that it would be impossible to elaborate an ideal reconstruction of society without paying some attention to the problem of child life. In his just published "Modern Utopia," Mr H. G. Wells explains how he pictures a world in which the wheels run more smoothly than in ours, and, as he is well known as a man of scientific training and vivid imagination, and one, moreover, who has already devoted much thought to social problems, we turn with some expectation to his pages dealing with child life in Utopia.

Naturally, we find that infantile mortality will be reduced to a minimum. "There is no reason why ninety-nine out of every hundred children born should not live to a ripe age. Accordingly, in any modern Utopia, it must be insisted they will."

The first and most important step towards the attainment of such results must be the limitation of birth, for Mr Wells adopts the conclusion which "Malthus has demonstrated for all time, that a State whose population continues to increase in obedience to unchecked instinct, can progress only from bad to worse." As to the means by which such limitation will be brought about, Mr Wells does not enter into details, but there will be no State breeding of the population. The idea of the State selecting individuals in order to pair them is an absurdity. But it will be quite another thing for the State to impose limiting conditions, and to say, "Before you may add children to the community for the community to educate and in part to support, you must be above a certain minimum of personal efficiency, and this you must show by holding a position of solvency and independence in the world; you must be above a certain age, and a certain minimum of physical development, and free of any transmissible disease. You must not be a criminal, unless you have expiated your offence. Failing these simple qualifications, if you and some person conspire and add to the population of the State, we will, for the sake of humanity, take over the innocent victim of your passions, but we shall insist that you are under a debt to the State of a peculiarly urgent sort, and one you will certainly

pay, even if it is necessary to use restraint to get the payment out of you; it is a debt that has in the last resort your liberty as a security, and, moreover, if this thing happens a second time, or if it is disease or imbecility you have multiplied, we will take an absolutely effectual guarantee that neither you nor your partner offend again in this matter."

As to the care of the children who are actually born in Utopia, we note with approval that the children are normally to be born into a home. Although Mr Wells' views regarding marriage are not strictly orthodox in the Christian sense, marriage will persist in his Utopia for several reasons, among them the general necessity for a home and for individual attention in the care of children. Children, he tells us, are the results of a choice between individuals; they grow well, as a rule, only in relation to sympathetic and kindred individualities, and no wholesale character-ignoring method of dealing with them has ever had the shadow of the success of the individualised home. "Neither Plato nor Socrates, who repudiated the home, seems ever to have had to do with anything younger than a young man."

The mother, then, will continue to be the natural guardian of the child, but the modern Utopia will recognise motherhood as a service to the State and a legitimate claim to a living. To every married woman who is likely to become a mother the State will secure from her husband a certain wage to secure her against the need of toil and anxiety; it may pay her a gratuity upon the birth of a child, and continue at regular intervals to pay her sufficient to keep herself and her child in independent freedom, so long as the child keeps up to the minimum standard of health and physical and mental development. The State will also, naturally, forbid the industrial employment of nursing mothers, and of mothers who have young children to look after.

The advantages of such an arrangement, we are told, are that it will abolish the hardship of the majority of widows, who "on earth are poor and encumbered exactly in proportion as they have discharged the chief distinctive duty of a woman; and miserable, just in proportion as their standard of life and of education is high." It will also abolish the hardship of those who do not now marry on account of poverty, or who do not dare to have children.

Some such arrangement as this, Mr Wells tells us, is merely the completed induction from the starting propositions that make some measure of education free and compulsory for every child of the State; and many of us are probably beginning to see that if we begin with free education we can scarcely logically

stop at free dinners. But very few have had Mr Wells' courage to try to work out the social condition at which one *would* stop. Mr Wells' ideas, therefore, are distinctly worth consideration. Criticism we can scarcely offer, because his proposals cannot, and are not meant to be taken as they stand. Indeed they are not, strictly speaking, proposals at all, but merely suggestions of things as they might be, and they must be considered in relation to other social conditions and arrangements. Economic conditions, for instance, are vastly different in Utopia from what they are with us; and many problems which vex civilised nations on earth—war and drunkenness, for instance—have ceased to interest any but antiquarians.

The Infants' Health Society (London).

In recent months Edinburgh has been very severely criticised on account of the number of its charities and the resulting overlapping and competition among them. The critics would doubtless prefer to see the special work of the "Infants' Health Society," founded in London in February 1904, in the hands of some existing organisation. There can, however, be no doubt that there is ample scope for the activities of the young society, and the just published report shows that a very good beginning has been made, especially in the record of the work done at the Infants' Hospital, Hampstead, during 1904.

During the year, 183 cases were dealt with, of which 30 died, and 94 were discharged as good recoveries. Of the others, 10 were unsatisfactory, 11 were the subjects of congenital disease, 12 were transferred to general hospitals, and 5 were removed by their mothers for various reasons. At the end of the year, 13 remained under treatment. Many of the cases admitted were very serious, it being a rule that no young infant should be refused, however hopeless the case may seem.

In order to represent graphically the severity of the cases, Dr Vincent, one of the physicians to the hospital, has adopted the plan of giving each infant so many marks according to its precise condition. The standard of normal development is taken, and each individual infant is "marked" accordingly. As the standard and the formula are constant, this enables one to estimate accurately the relative severity of malnutrition present. On the system adopted, a healthy infant of the proper weight for its age would receive 1000 marks. To this figure is given the name "weight index," and the formula below illustrates its application :—

$$\text{Weight index} = \frac{\text{actual weight of infant}}{\text{normal weight of healthy infant of same age}} \times 1000.$$

The average weight index on admission of the infants that died was 450, and the severity of the cases that recovered is shown by the fact that their average weight index on admission was only 505.

Attention is drawn to the value of the hospital for the training of infant nurses, probationers receiving one year's training, and having experience of the care and feeding of at least one hundred infants.

One other point of interest in the report may be referred to. The hospital has been criticised on the ground that it has frequently been found impossible to keep a number of even healthy babies in a ward with satisfactory results. The reason for failure, says Dr Vincent, was probably always the same, namely, impure milk or improper methods of substitute feeding. In the Infants' Hospital not a single case of epidemic diarrhœa (zymotic enteritis) developed, despite the fact that on one occasion there were six cases in the wards brought to the hospital suffering from the disease.

We have much pleasure in drawing attention to the work of the Infants' Health Society. The secretary is Mr R. A. Garratt, 120 Victoria Street, London.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

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RECENT VIEWS ON LEUKÆMIA

THE views of Ehrlich and his pupils on the complicated subject of Leukæmia had been accepted by the majority of observers for some time. More recent publications, however, are gradually adding strength to the conviction that although there are two forms of the disease, there is no such sharp line of demarcation between them as Ehrlich teaches.

Ehrlich in his classification of leucocytes completely separates in origin and function the lymphocyte from the granular cells, and consequently in his description of the forms of leukæmia must necessarily uphold the same wide difference between the myelogenous and lymphatic types. But the work which has been done by various observers on the origin and function of the white cells of the blood, suggesting that the lympho-

cyte is a derivative of the bone marrow as well as the granular leucocyte, combined with careful clinical observations, tend to the view that in the bone marrow we have the primary lesion in all the forms of leukæmia, and the microscopical appearance of the blood is merely an indication of the condition of the bone marrow.

Acute Myelogenous Leukæmia.—Up to the year 1898, lukæmias were grouped as myelogenous, lymphatic (acute and chronic), and atypical or mixed types. Since that year, however, cases have been published of undoubted instances of acute myelogenous leukæmia, and the recognition of this type has helped considerably in solidifying our views on the whole question.

Only twelve cases so far have appeared in the literature of the subject, and their rarity and importance is sufficient reason for summarising them.

Though Lazarus (1) even now still holds the view that all cases of acute leukæmia are lymphatic, and the majority described as myelogenous are explained by the confusion of the large lymphocyte with the large mononuclear leucocyte, the twelve cases which have been reported establish the identity of the condition without question. The earliest recorded case was in 1898 by Thomson and Ewing (2), and since then other cases have been studied by Arneth (3), Ewing (4), Grawitz (5), Hirschfeld and Alexander (6), and Billings and Capps (7). The two most recent are recorded by Gordinier (8) in October 1904, and Elder and Fowler (9) in December 1904.

The condition begins usually more or less acutely, and in the cases recorded the duration varied from fourteen days to two months.

In its general symptoms, with its short course and acute manifestations, the condition closely approaches the type of acute lymphatic leukæmia, of which over 150 cases have been studied.

The spleen in all the cases was felt slightly enlarged, but in only two of the cases did it extend more than a finger's breadth below the ribs. Cutaneous hæmorrhages, along with stomatitis, a considerable degree of anæmia with progressive asthenia marked the course of the disease. The leucocyte count varied very considerably—from 360,000 per cm. in Billings and Capps' case, and 274,000 in Gordinier's case, to 10,600 per cm. in Leube and Arneth's case. The presence in all of a greater or less proportion of myelocytes led to a diagnosis—the highest being 60 per cent. of the total leucocyte count, and the lowest 8.6 per cent. From a study of the cases Elder and Fowler give the following as the main conclusions:—

(1) The course and clinical features of acute myelocytic leukæmia are practically identical with those of the much more common acute lymphatic leukæmia.

(2) The anæmia is generally greater than in the ordinary chronic cases.

(3) The leucocyte count is not always high ; it may be little above normal, but sometimes rises to a figure comparable to what is got in chronic cases.

(4) Eosinophiles may be absent or few ; the same is to an even greater extent true of mast cells. As in other cases of a typical leukæmia, many of the leucocytes are difficult to classify, and forms morphologically intermediate between large lymphocytes and myelocytes are common. Non-granular polynuclears are also found.

Normoblasts may be absent or plentiful, and megaloblasts are sometimes present.

Acute Lymphatic Leukæmia.—Numerous cases are being constantly recorded of this type, and a careful study of the clinical symptoms and pathological appearances only tend more and more to a refutation of Ehrlich's view that the condition is entirely independent of any changes in the bone marrow. Several cases have been observed and recorded of acute lymphatic leukæmia *without glandular enlargement*, and with no very definite microscopical changes in the structure of the glands. The structure of the marrow, according to recent workers, is really a lymphoid tissue capable of producing lymphocytes. And as no case has as yet been published in which the lymph glands alone were affected, the conclusion must force itself upon one that the marrow is more probably the invariable place of origin of the disease. It does not necessarily follow that the lymphocytes in lymphatic leukæmia are found only in the bone marrow, though in most cases of lymphatic leukæmia probably the circulating lymphocytes are formed there. Both varieties of leukæmia, then, are probably myelogenous in origin. This close relationship between the two types is also suggested by the presence at times of granules in the lymphocytes by their now recognised power of amœboid movement, and the probable origin of granular cells and lymphocytes from a common ancestor.

Melland (10) is of the opinion that the large lymphocytes in lymphatic leukæmia are structurally imperfect cells, as shown by their extreme fragility to be incapable of carrying on their normal functions, and their presence in the blood in such large numbers is simply an expression of an abnormal proliferative activity. In the marrow, too, neutrophiles and eosinophiles are

completely replaced by cells similar to those in the blood. These so-called large lymphocytes in lymphatic leukæmia, he thinks, bear no relationship to the lymphocyte of normal blood, but are, in reality, retrograde forms of the neutrophile myelocytes of the marrow. These cells occur, too, in the myelocytic form, and in his opinion lymphatic leukæmia is merely the result of a retrogression of the granular cells.

Treatment of Leukæmia.—Since 1903, X-ray treatment has been employed in leukæmia in a number of cases.

Dock (11) has published a review of its use in leukæmia from the reports of 29 cases.

Of chronic lymphatic leukæmia there were five cases in the series. One reported in April 1903 was still alive in 1904, and in the others the results were encouraging though the patients subsequently died.

Twenty-one of the cases were myelocytic. In 11 of the patients the leucocytes, after treatment, fell nearly to normal. In 7 others the reduction was not so marked, but in all a qualitative change for the better was observed in the disappearance or reduction in the proportion of the myelocytes. The effects on the enlarged glands and spleen were also favourable. Reduction of the spleen and glands to normal size has been observed in a number of chronic cases. In the favourable cases the length of time in which the reduction of the leucocytes to normal was affected varied from one to six months.

Dock is of the opinion that the action of the Röntgen rays is probably upon tissues that produce the pathologic leucocytes.

Ætiology of Leukæmia. Very little advance has to be recorded in the elucidation of the ætiology of leukæmia.

Two theories naturally have been advanced by different observers, (1) the parasitic, (2) the toxic.

Löwit has endeavoured to prove that a protozoon "hæmamœba leukæmia magna" is the cause of myeloid leukæmia, and another, "hæmamœbe leukæmia parva," the cause of lymphatic leukæmia. Already, however, only contradictions of his results have appeared, and in all probability his parasites are only artefacts—probably the basophilic granulations of the mast cells. Further investigations and corroborations are necessary before Löwit's results can be accepted.

Moorhead (12) is inclined to favour a toxic origin in leukæmia, and in his preliminary observations has indicated that the conditions found in leukæmia all favour such a theory.

He has, moreover, separated a substance from the affected lymphatic glands in leukæmia not found in normal glands, which has a depressor action on the heart. This substance, which he thinks is probably a specific toxin, produces marked changes in the hæmopoietic tissue of rabbits after continued injection.

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SURGERY

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SURGERY OF THE GALL-BLADDER

THOUGH it has long been recognised that cancer of the gall-bladder and biliary ducts is often present in cases of gall-stone disease, the subject is still one requiring further investigation, both as regards the frequency of the association and the ætiological relationship of the two conditions. A most interesting and instructive paper on this subject has been published (*Lancet*, April 22) by Dr Slade of the pathological department of the London Hospital, who investigates the question mainly from the standpoint of the post-mortem room, though he has also availed himself of the clinical records of the hospital.

In 2180 autopsies during a period of 26 months, there were 33 cases of gall-stones, the concretions being either present in the bladder or having been recently removed by surgical operation.

In 17 of these 33 cases gall-stones had caused no symptoms during life, and were only discovered post-mortem. The gall-bladder appeared quite healthy and smooth in 16 of these, while in *one* it showed "chronic inflammatory thickening," which proved on microscopical examination to be carcinomatous.

Of the remaining 16 cases where gall-stones had caused trouble during life, 4 had obvious carcinoma, and the other

12 showed "chronic inflammatory thickening" of the wall of the gall-bladder. Of these 12, 5 were subjected to microscopic examination, and proved to be cancerous. The other 7 were unfortunately not examined, but Dr Slade believes that some at least would have shown cancerous changes.

Carcinoma was thus found in 30 per cent. of all cases of gall-stones, and in 56 per cent. of the cases where symptoms had occurred during life, and this percentage would probably have proved greater if all cases had been microscopically examined.

The two points insisted on are (1) that cancer due to gall-stones (for Dr Slade considers the relation a causal one) is much commoner than is supposed; (2) that in many cases carcinoma is present in the gall-bladder when it would not be suspected from the naked-eye appearances, and he would suggest to surgeons that it is advisable to remove the gall-bladder in all cases where this can be safely done.

It would clearly be of interest, in view of these figures, to follow up all cases operated on for gall-stones where the gall-bladder has been left, to see if any subsequently develop cancer. This Dr Slade proposes to do with the assistance of the surgical staff of the hospital.

The statistics in this paper as regards the frequency of carcinoma are certainly startling, and greatly in excess of those given by clinical observers. This is probably due to the fact that they are based on post-mortem records. During the same period, however, 61 cases were operated on in the hospital for gall-stones, and in 11 carcinoma proved to be present, a high percentage.

In the "American *Journal of the Medical Sciences*" (April 1905), the brothers Mayo publish an article reviewing the results of 1000 consecutive cases of operation for gall-stone disease, with special reference to mortality. An inquiry into the frequency of carcinoma forms *no* special part of the paper, and therefore it may not be fair to take the figures presented as expressing the writer's opinion on the point; yet it is of interest to note that in only 40 cases, or 4 per cent., was carcinoma present, a percentage much less, as might have been expected, than one founded on post-mortem records. As regards "latent" carcinoma of the gall-bladder, in two cases it was found microscopically in gall-bladders which had been removed at operation simply on account of some thickening, and because they were functionally useless; and in two more recent cases, not included in the present series, carcinoma was found to be present when the naked-eye appearances suggested only a diagnosis of chronic thickening.

As regards the question of the removal of the gall-bladder, some recent writers have recommended it as a routine procedure in all cases of gall-stones on the ground that the organ is useless and its retention likely to lead to the formation of new stones. The Mayos cannot agree with this view. In the first place, the operation of cholecystectomy is rather more dangerous than that of cholecystostomy, giving in their hands a mortality of 4.3 per cent., as compared with one of 2.4 in the case of the more conservative operation, besides which the gall-bladder often gives the best route for draining the biliary passages in cases of cholangitis, or where stones have been removed from the common bile duct. In no case did stones re-form in the gall-bladder when it was left, and that in a large number of cases, so that the authors consider cholecystostomy as the natural and safe operation, reserving cholecystectomy for cases where it is specially indicated—in their experience about two out of every 5 or 6 cases. The cases requiring removal of the gall-bladder they consider to be:—

1. All cases where stenosis of the cystic duct exists or is likely to follow from the operation, but in most cases where bile is present in the gall-bladder cholecystostomy is sufficient.

2. Most cases of cholecystitis not due to gall-stones, as the exciting cause is apt to persist.

3. Where much inflammatory thickening exists, and there is reason to fear carcinoma.

The mortality statistics are made up with every care against under-statement, and aim at giving a fair idea of the relative curability of the disease.

In the 1000 cases 50 deaths occurred, a mortality of 5 per cent. In 40 malignant cases, 9 deaths, a mortality of 22 per cent. In 960 benign cases, 41 deaths, a mortality of 4.26 per cent.

820 cases, where disease was confined to the gall-bladder and cystic duct, yielded a mortality of 2.44 per cent.; while the mortality was 11.7 per cent. in 137 cases where stones were present in the common duct.

The high mortality in common duct operations the writers consider to be due not so much to the increased difficulty of the operation as to the more frequent presence of jaundice and infection of the bile passages. About one-third of their cases of choledochotomy had no jaundice and very little infection at the time of operation, though there was in all a history of jaundice and cholangitis at some time or other, and these cases gave a mortality of 2 per cent., so that common duct cases may be expected to do very well if operated on during the intervals between acute attacks of illness. Unfortunately a majority of the cases never had an intermission of symptoms, or had passed

beyond that stage, so that operation had to be performed under unfavourable conditions as regards jaundice and cholangitis, and the mortality was correspondingly high.

Malignant cases the writers have found, on the whole, very unsatisfactory, the only really favourable cases being the two already referred to, in which the gall-bladder was removed in a very early stage of carcinoma, the patients being both well two years after operation.

Some individuals, the writers consider, are almost bound to die after operation. In the first place those with profound jaundice and subcutaneous hæmorrhages, who die from capillary oozing, the chloride of calcium having no apparent effect on the hæmorrhage. Secondly, those cases, four of which they have met with, in which no bile exists in the biliary passages, the liver having been apparently put out of action. This last class of case is almost impossible to diagnose before operation. The patients had profound jaundice, but, though very feeble, were up and going about prior to the operation.

Da Costa (*New York Medical Journal*, 8th April) publishes an interesting case of suppurative cholecystitis occurring in a child during convalescence from typhoid fever, and cured by operation. It has been pointed out by Rolleston that invasion of the gall-bladder by the typhoid bacillus is much commoner than is generally supposed, and it is suggested here that many cases of relapse in typhoid fever may be due to post-typhoidal cholecystitis, which may or may not go on to suppuration.

A case of rupture of the gall-bladder and hepatic ducts from a fall of 15 metres, is reported by Spillman in the *Archiv. Prov. de Chirurgie*, Dec. 1904. The effused bile was drained off from the abdomen, and a subsequent attempt was made to reach and suture the ruptures, but without success. Such cases are fortunately rare, and it has generally been found that if the rupture or ruptures do not close up by adhesions after drainage for the bile from the abdomen has been provided, there is very little hope of recovery.

OPHTHALMOLOGY

By ANGUS M'GILLIVRAY, C.M., M.D., F.R.S.E.,

Lecturer on Ophthalmology, St Andrews University; Ophthalmic Surgeon, Dundee Royal Infirmary; Surgeon, Dundee Eye Institution, etc.

The Bacteriology of the Conjunctival Sac, and its Relation to Operative Interference on the Eyeball.—This is a subject of the utmost importance to the ophthalmic surgeon,

and has naturally attracted the attention of many writers and workers. The literature is now assuming large proportions, yet the subject is by no means exhausted. Any fresh views are always welcomed, especially if these be based on careful bacteriological and clinical observations.

STEDMAN BULL, of New York, in an interesting paper in the *Medical Record* of September last, summarises his conclusions as follows:—

"I. A careful microscopical and bacteriological examination should be made of the contents of the conjunctival sac in every suspected case, carrying the examination so far as the cultivation of the bacteria in a proper medium, and the subsequent inoculation of the germs.

"II. If toxic germs are found in great numbers, no matter what their varieties, no operation on the eyeball should be undertaken until the germs have disappeared, and the conjunctival sac has been rendered as sterile as we can hope to make it.

"III. If there is suppurative disease of the lachrymal passages, whether of the canaliculi, sac, or nasal duct, all operations upon the eyeball are positively contra-indicated. The lachrymal sac must be excised, and the lachrymal puncta must be obliterated by the galvano-cautery, before operation on the eyeball is undertaken. In the case of a catarrhal dacryocystitis, or of mucocele of the sac, both canaliculi should be incised, and the sac injected daily with an antiseptic astringent solution, and free irrigation through the nasal duct carried out until all secretion has ceased. Even in cases of great urgency, as, for example, acute inflammatory glaucoma, the writer would not feel himself justified in modifying the above statement.

"IV. If the secretion of the conjunctival sac on examination has been found to be infected, but the bacteria are few in number and of slight toxic variety, operations may be done on the eyeball when necessary; but these eyes should be opened and examined twice in the twenty-four hours, and the conjunctival sac gently irrigated with warm normal salt solution, or warm sterilised boracic acid solution, and then the eyeball should be immediately rebandaged.

"V. In operating on the normal eyeball in the presence of an apparently normal sterile conjunctival sac, the following steps should be taken:—

"1. The forehead, eyebrows, temple, cheeks, bridge of nose, and external surface of the lids should be carefully cleansed with hot water and soap, and dried with aseptic cotton pads.

"2. The margins of the lids should be carefully, but gently, rubbed with moist cotton pads, and simultaneously irrigated with a warm, sterilised, physiological salt solution.

"3. Careful irrigation of the conjunctival sac with the same sterilised normal salt solution, and then closing the lids with a moist sterilised cotton pad. The lids should remain closed in this way until the speculum is introduced.

"VI. In all cases the bandage should be removed and the eye examined under the strictest aseptic precautions, as strict as those employed at the time of operation.

"VII. On the first sign of infection of the wound the edges of the lids are to be thoroughly cleansed in the same manner as at the time of operation; the conjunctival sac is to be thoroughly irrigated with the sterilised normal salt solution; the wound is to be re-opened and cauterised through its entire length with the galvano-cautery; and the anterior chamber is to be gently but carefully irrigated with a sublimate solution (1 in 5000); and the conjunctival sac must be again irrigated, and the lids must be closed simply under a moist sterilised pad."

With the object of applying a continuous antiseptic solution to a septic conjunctival surface, MADDOX, of Bournemouth (*Ophthalmoscope*, Nov. 1904), recommends applying over the closed lids at the inner canthus finely powdered boracic acid.

Maddox states that the two principal causes of failures after cataract extraction, granted skilful performance of the operation, are:—1. Deficient vitality, or "resisting power," of the tissues. 2. The impossibility of effecting absolute disinfection of the conjunctival sac, particularly in the presence of any infection of the tear passages. The two procedures that Maddox describes are (1) conjunctival suture, and (2) the application of a persistent antiseptic dressing over the tear passages.

1. As advantages of conjunctival suture he claims more speedy union, protection from infection, greater security from accident, smaller prolapses, if any, greater freedom for the patient, fewer cases rejected as inoperable, and the greater facility with which the open dressing can be employed. As possible disadvantages he mentions the small amount of aid they afford, the danger of sepsis, prolongation of the operation, and increased astigmatism.

2. As regards persistent antisepsis after operation, Maddox refers to one case in which, after closing the lids at the conclusion of the operation, the hollow between the eye and the root of the nose was filled up by a small teaspoonful of finely powdered boracic acid. The usual dressings were then laid over this. By the following morning the tears had melted a greater part of it away, showing that the lachrymal sac must have been perpetually bathed in the solution. In other cases he has used the common surgical combination of iodoform and boracic acid with good results.

The bacteriology of the conjunctival surface has not received the same amount of attention *after* as *before* operation, and it is therefore interesting to learn the results of work done in this direction. BOSSALINO (*Annals of Ophthalmology*, Jan. 1905) states that many are the micro-organisms which are found on the normal conjunctiva, but what action they have is not yet known. The object of Bossalino's investigations is to find out to what extent a normal conjunctiva can be rendered aseptic, and the importance we may ascribe to the micro-organisms which resist the ordinary disinfection, preceding and following operative acts in ocular surgery. This important subject has been studied previously by others, and all seem to agree that with the usual means at our disposal only a diminution of germs or a retardment in their multiplication is possible. The experiments were made on eighteen patients operated on for cataract. The author took cultures in all these cases the first and second day after the operation, isolating fourteen times the staphylococcus pyogenes albus, four times the staphylococcus pyogenes aureus, twice the staphylococcus citreus, twice the staphylococcus cereus, and once the sarcina lutea, and of each he inoculated a part on the cornea of rabbits—always with negative results. From these experiments Bassalino concludes that, although the isolated germs possess all the morphological and biological characters of the staphylococcus, inoculated on the cornea, injected under the skin and in the peritoneal cavity of different animals, they lose the power of pus formation. He, however, did not stop here, but went further to find out if these germs completely lose their virulence, or if they can, under certain conditions, be invigorated and rendered again active. With this object in view he made cultures from a patient in whom extirpation of the sac for dacryo-cystitis had preceded cataract extraction, and the secretion had completely disappeared. These cultures produced numerous colonies of staphylococcus pyogenes aureus, and very few of the staphylococcus pyogenes albus. Pure cultures were then made, and with all due precautions dissolved in a solution of chloride of sodium, and a small quantity was injected into different parts of rabbits and on the cornea with negative results. Another culture not diluted in chloride of sodium solution was then injected under the skin and in the peritoneal cavity, and this time a swelling appeared on the abdomen, from which a serofibrinous exudate was extracted. This liquid was used to make new cultures, which developed numerous colonies of staphylococcus pyogenes aureus, of which four cubit centigrams with a special syringe were injected under the skin, in the peritoneal cavity, and a few drops were inoculated on the cornea of guinea-

pigs. The animals died in four hours from septicæmia and peritonitis, and on the cornea of the other an abscess appeared which rapidly spread, producing the loss of the organ from panophthalmitis. These experiments show that the staphylococcus pyogenes aureus, isolated by Bossalino, although innocuous in the conjunctiva after the antiseptic precautions taken in cataract extraction, under favourable conditions is apt to regain virulence and become a factor of great danger in eye surgery. Bossalino does not agree with Axenfeld, who thinks that the eye resists microbic infection more than other parts of the body, and that the only pathogenic germ excepted is the diplococcus of Fränkel. He has proved that if the eye resists them it is because they have lost their virulence and not because the eye tissues are more resisting than others. Valude gives great importance to the tears, which he considers of great germicidal powers. In conclusion, Bossalino says:—

1. It is impossible to render the conjunctiva aseptic.
2. The eye has not more power of resistance to infection than other organs.
3. The tears and the antiseptics used before and during the operation decrease the number of germs and lessen their virulence.
4. Under favourable conditions these germs are apt to become active and virulent, producing disastrous results in ocular surgery.

Poisoning by Wood Alcohol.—"Cases of Death and Blindness from Columbian Spirits and other Methylated Preparations" (Casey A. Wood, Chicago, and Frank Buller, Montreal, *Annals of Ophthalmology*, Jan. 1905).—These writers have reported at length, under the above title, the list of deaths and cases of blindness following the ingestion of "Columbian spirits" and other forms of wood alcohol, as well as methylated "Jamaica ginger," "lemon extract," "bay rum," and many other domestic and proprietary remedies.

The symptoms varied with the amount consumed. Headache was mentioned in nineteen cases as a conspicuous symptom, gastric pain in eleven, nausea and vomiting in twenty-six, dilated pupils in twenty of the fifty-four cases with tabulated records. From a study of the cases they have made a classification into three degrees of poisoning:—

1. "An ordinary mild intoxication, with perhaps some dizziness, nausea, and mild gastro-intestinal disturbance, terminating in perfect recovery in a few days, but occasionally followed by more or less serious damage to vision."
2. "A toxic effect more pronounced in every way, dizziness,

nausea, vomiting, and gastro-enteritis being conspicuous symptoms. Dimness of vision, often increasing to total blindness, is characteristic of this degree of poisoning."

3. "An overwhelming prostration which terminates in coma and death."

Some of the conclusions drawn are; to this date at least 153 cases of blindness and 122 deaths have resulted from this poison; in all 275 instances of lost life or eyesight. The injury to the ocular apparatus consists chiefly of a destructive inflammation of the optic nerve fibres or retinal elements or both, followed by their atrophy. The blindness is bilateral, and may set in in a few hours after imbibing the poison, or it may be delayed for several days. It is generally complete, with a subsequent improvement, and finally a relapse into permanent blindness. The visual fields are contracted, and exhibit absolute central scotoma. The ophthalmoscope at first reveals a congestive nerve head, followed by greyish or white atrophy and contracted blood-vessels.

The treatment of methyl alcohol intoxication consists of getting rid of the poison from the stomach and intestines by means of the stomach pump and rectal injections. Stimulants, especially ethyl alcohol, strychnine, coffee, and heat to the body and extremities.

An Investigation of the Blind Department of the Chicago Public School System (I. F. Campbell, *Ophthalmic Record*, October 1904).—Campbell reviews the work done and progress that is being made in the blind department of the public schools of Chicago. The system adopted is specially interesting in that the blind children are taught in the schools along with sighted children. They are first taught their alphabet by special teachers, who always assist them along as they may need assistance to keep up with the other pupils. The child is placed in the class with the other children, and takes part in all the exercises, using specially printed books and maps covering the same matter as the lessons of the other children. The child reads with the tips of the fore and middle fingers of the right hand, while he keeps the line with the tip of the left forefinger. They use the Braille system adapted to the American needs. Six dots, by different positions and combinations, make up the alphabet.

The author gives a most interesting report of the progress of the pupils, and their advances, as shown by this report, are both gratifying and surprising. Many of these blind children are able to keep up with other children of their age. There are twenty-eight children thus receiving their education, and the

progress they are making compares most favourably with the work of the Institution for the Blind.

Retinal Hæmorrhages as the First Manifestation in a Case of Diabetes (C. S. G. Nagel, *Ophthalmic Record*, October 1904).—Nagel reports a very interesting case in which the retinal hæmorrhage was the first symptom of the diabetes. He mentions the ocular manifestations of diabetes in the way of Foerster's cataract, Hirschberg's central retinitis, suddenly and rapidly developing myopia, retro-bulbar neuritis, and the anomalies of accommodation. The strangest feature of the case was that the retinal hæmorrhage came on in a patient in apparently perfect health, without any other manifestation of diabetes. The author says:—"As to whether other ocular symptoms ever play the rôle of a first manifestation at all, I can merely give it as my general impression that such is but rarely the case. Leber states directly, regarding retinal affections, that they only come on after years, and that there never had been such a case recorded where at least emaciation and general decline had not been present."

OTOLOGY

By ALBERT A. GRAY, M.D., F.R.S.E.,
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OPERATIONS ON THE INTERNAL EAR

ONLY a few years ago it would have been looked upon as surgical madness to open the cavity of the internal ear except for the purpose of removing pus. The state of matters has greatly changed of late, and in a few cases the aurist may now be justified in entering this cavity in affections where there are certain symptoms which cannot be relieved by less severe measures.

At a meeting of the British Otological Society held on March 6, 1905, Dr Lake gives a full description of such a case, the termination of which was very satisfactory; a termination which, unfortunately, is not very common in these cases. The patient suffered from extreme deafness in both ears, and the voice, even when shouted close to the patient, was not heard at all. Tinnitus of a very depressing character was also present and attacks of vertigo of a very severe description were common. The tendency was to fall forwards. The tinnitus was much worse in the right ear, indeed upon the left side there was little complaint of this symptom. All the recognised methods of

treating the affection, including removal of the stapes, had been tried with the usual negative result.

After obtaining the consent of the patient, Dr Lake opened into the cochlea immediately in front of the round window after having made a free exposure of the inner wall of the middle ear by means of a complete post-aural operation. During the process of opening the cochlea the burr slipped and tore through the facial nerve. There appeared to be little shock from the operation and for the space of about two weeks the patient had no tinnitus whatever. The facial paralysis was relieved by Dr Cheatle, who stitched the distal end of the facial nerve to the proximal end of the hypoglossal, and the operation was completely successful as far as the paralysis was concerned.

The tinnitus gradually returned, however, and soon became as severe as ever. The attacks of vertigo also became gradually more frequent and more severe, and at the patient's own request she was readmitted to the hospital for further operation. On this occasion the wound of the previous operation was reopened and the semi-circular was laid bare and finally removed. The outer wall of the vestibule was then destroyed. Next, directing his attention to the cochlea, Dr Lake reopened the wound in the outer wall of that structure and found that the opening of the previous operation had not been filled with bone, but was still quite as large as when made. The hole was enlarged and the second whorl of the cochlea was also opened up. The modiolus was destroyed and during this part of the operation the cranial cavity was opened in the region of the internal auditory meatus. This opening of the cranial cavity is almost unavoidable if a complete destruction of the auditory nerve is aimed at, as must be the case until further knowledge of the functions of the various portions of the cochlea is obtained. It is unfortunate that this should be so, since the flow of the cerebro-spinal fluid necessarily interferes with the performance of the operation. It is stated that, as a result of this second operation, there was no nystagmus or vertigo as the operator seemed to expect. The final result of the operation was satisfactory in the extreme, the attacks of vertigo have never since reappeared and only a slight degree of tinnitus remained, this being due apparently to the fact that some of the fibres of the cochlear nerve escaped destruction. The hearing was of course destroyed, but as it had been of no practical value to the patient before, this loss need not be reckoned in accounting the value of the operation.

The fact that there was no vertigo after the second operation seems to have puzzled the operator and several of the speakers who discussed the case, but the reviewer must point out that

this is not at all remarkable from what has long been known regarding the physiology of these interesting structures. It was shown several decades ago that complete destruction of the nerve caused no loss of equilibrium in the lower animals, and we need not therefore be surprised if the same state of matters occurs in the human subject.

Cases of a nature similar to that just described, have been operated on by Dr Milligan and put on record, and Dr West stated that he had operated on three. None of the cases seem to have been fatal, though it must be remembered that there may have been many cases attended by other surgeons that did not escape so fortunately, and this must always be taken into account when estimating the value of the operation.

Attempts to deal with this class of cases in a surgical manner have also been made in a totally different direction, that is, by dividing the auditory nerve within the cranium. The first to attempt this operation was Wallis, but the patient obtained no relief, and Parry had a similar case which also remained unbenefited. On the other hand, Armour has performed the operation with complete relief to the symptoms and without the facial paralysis which has occurred in the majority of the cases that have not died as a result of the undertaking.

Referring to the value of these operations, it may be said that after the experience of the surgeons described above, the division of the nerve within the cranial cavity can hardly be justified on any grounds whatever. The fact that the tinnitus remained after the operation does not prove that symptom was of central origin, but may and probably does mean that the ends of the nerve have grown together again. There has never been cited a single reason for believing that tinnitus is ever of central origin except in the case of intra-cranial tumour, and even in these cases the symptom is exceedingly rare, is transient and never of a severe type.

With regard to the operative undertaking first described, the matter is quite different. There is clearly justification for the performance of this operation, although the number of suitable cases must always be very limited. The opening of the internal ear even when associated with destruction of its contents, appears not to be a very fatal operation, unless some surgeons are failing to record their unsuccessful cases. The operation is of course difficult, but with increasing experience this difficulty should be diminished, and with improved methods of technique there is no reason why severe cases should not be treated in this way. Ordinary therapeutic measures are usually of no avail and serve only to disgust the patient and his medical attendant.

There appears to be no doubt that operations of the kind

referred to will become a feature of the aural surgery of the future if the mortality does not prove too great. The class of cases which admit of an operation which may be considered justifiable must remain very limited in number, since it involved destruction of the little sense of hearing which may remain, and since the disease is in the great majority of cases bilateral in its incidence. The question of diagnosis also will in many cases prove a stumbling-block, because the vertigo in itself gives no clue as to the ear which is affected. In respect to this matter, none of the operators have made any definite statement, probably because in their cases there was no doubt as to the affected ear. Lake seems to have inferred from the fact of the tinnitus being worse in one ear, that that ear was also the seat of the lesion which produced the vertigo. This is an assumption which may in general prove correct, but more certainty of knowledge must be obtainable before such a serious operation be justified in a great majority of cases.

It must be emphasised that under no circumstances is the aurist justified in promising the slightest relief to the patient in respect to the deafness. Increasing knowledge may require a modification of this statement, but at present it remains undoubtedly true. For the sake of the reputation of aural surgery, it is to be hoped that aurists will be careful in the selection of the cases which they subject to these serious undertakings. With such precautions, however, there is no doubt that they are quite justifiable.

New Books and New Editions

Chirurgie du Système Nerveux. By GEORGES MARION, Professeur Agrégé of the Faculty of Medicine of Paris, etc., etc. Published under the direction of MM. PAUL BERGER and HENRI HARTMANN. 1 vol., 536 pp. Paris: Ed. G. Steinheil, 2 Rue Casimir-Delavigne. Price 18 francs.

PROFESSOR MARION'S new book on the Surgery of the Nervous System is in some respects the best we have seen. Particularly is this the case in connection with that considerable part of the work which is devoted to the consideration of the surgery of the nerves themselves.

In the first part of the book the author discusses the affections of the cranium and its contents. After a description of the general anatomy, M. Marion discusses cerebral topography. Of ten different methods described, he gives the first place to that of Chipault, while the methods of Broca-Championnière,

Poirier, Krönlein, and Lannelongue-Mauclaire are also favourably mentioned.

The author is of opinion that extreme exactitude in cerebral topography is not called for; and in these days of wide exposure of the brain by the osteoplastic method, there is some truth in the statement.

In the selection of an anæsthetic for brain surgery the author expresses no preference for any particular drug, but recommends that the anæsthetic employed should be the one which the operator is most in the habit of using for general purposes.

A concise account is given of all the best known methods of trephining and craniotomy, and the subject is elucidated by a large number of excellent illustrations.

There follows a series of chapters on the diagnosis and treatment of affections of the cranium and brain, such as fractures, cerebral abscess, and tumour, traumatic epilepsy, hydrocephalus, encephalocele, etc. Special attention is given, in some twenty pages, to the localisation and extraction of bullets and other foreign bodies in the brain.

M. Marion's views on the subject of surgical interference in traumatic epilepsy are interesting. He maintains that marked mental deterioration is the only real contra-indication to operation in all cases of epilepsy, localised or general, where trauma is found in the antecedent history of the case. Contractures, due to pyramidal degeneration, do not in his opinion contra-indicate operation. M. Marion does not approve of Horsley's suggestion that, in cases where, on exposure of the brain, no obvious lesion is found, the centre for the movements of the muscles affected should be defined by electricity and resected. In this opinion he is probably supported by the majority of surgeons. He approves of Horsley's operation *à deux temps*, in dealing with cerebral tumours.

For the relief of intracranial tension in cases of inoperable tumours, he approves of lumbar puncture, frequently repeated if necessary, before resorting to craniotomy. He says that it is preferable to abstain from such palliative operations in cases where the prolongation of the life is a source of *tristesse* to the patient and his friends—a somewhat debatable point in ethics, perhaps.

In microcephalus the author is opposed to craniotomy, as suggested by Lannelongue and others, it being now realised that the fault lies primarily and chiefly in the brain itself, and not in faulty development of the skull.

The second part of the book is devoted to the spine and cord. The topographical anatomy and physiology of the cord

are, from the surgical standpoint, very fully described and illustrated. M. Marion believes in a large opening into the spinal canal if one is to avoid missing lesions, the minimum number of arcs removed being four. The spines of the vertebræ are not completely removed, but cut through at their bases and left adherent to the fibrous structures covering them; they are then swung aside, to be eventually brought into position again at the end of the operation. The author is of opinion that in cases of spina bifida, operative interference should not be undertaken except in the most favourable cases and at the express wish of the parents after the risks have been duly explained. The weakly condition of the patient, the difficulty of maintaining asepsis, and the low vitality of the tissues which close the opening render the operation dangerous and frequently unsatisfactory.

The third part, of some 170 pages, the most valuable and original part of the work, is devoted to the surgery of the nerves. There is a full description of the various diseases and injuries of nerves which may call for surgical intervention, and of the many operative procedures which may be used for their treatment. An excellent and profusely illustrated account is given of the dissections necessary to expose all the peripheral nerves of any importance which the surgeon may be called upon to deal with.

On the whole the book is excellent: the illustrations are numerous and well executed, and the references are full and cosmopolitan. It should be of great value to the operating surgeon.

What Venereal Diseases Mean and how to Prevent Them. By Professor ERIK PONTOPPIDAN, Chief Physician to the Lock Hospital, Copenhagen. Translated by W. TESSEN. Pp. 79. London: John Bale, Sons & Danielsson, Ltd. 1905.

AT the International Congress for prophylaxis in syphilis and venereal diseases, held in Brussels in 1899, it was resolved that efforts should be made to disseminate knowledge regarding the significance and prevention of these diseases. It was recognised that one of the chief influences rendering this public danger difficult to cope with was the ignorance of the public concerning these evils, owing to the systematic reserve in which they are shrouded. The pamphlet under review consists of five lectures given for the first time under the auspices of the International Congress in 1899. Dr Pontoppidan published them in response to requests from various quarters, and also partly because he considered the period of private initiative had passed. They were

delivered before an audience of students from all the faculties of the University, and the endeavour was particularly to point out the significance and prevention of venereal disease.

The lectures are only semi-scientific, so that they may be appreciated by students who are unfamiliar with medical terms, are excellently suited for their purpose. They emphasise the danger of infection incurred by students and others in regard to these diseases, and indicate in no uncertain way the dread results which so frequently occur if the disease be acquired. Especial attention is drawn to the number of students who suffer from venereal disease.

For many years we have believed that measures should be taken to enlighten the public regarding venereal diseases, but the difficulty of discussing a subject which is considered a shameful one is very great. These lectures, however, inaugurate a new departure, and we welcome the work, which is useful and instructive, and of which the publication may induce others to give similar instruction to young men.

Diseases of the Blood. By Prof. Dr P. EHRLICH, Frankfurt a. M.; Prof. K. VON NOORDEN, Frankfurt a. M.; Dr A. LAZARUS, Berlin; and Dr F PINKUS. Edited, with additions, by ALFRED STENGEL, M.D., Philadelphia, U.S.A., and translated under his supervision. Nothnagel's Practice. 8vo, pp. 714, 13 plates. Philadelphia and London: W. B. Saunders & Co. 1905.

WE welcome this translation of a well-known and useful book, and congratulate the editor on the accomplishment of what must have been a difficult task. In this difficulty there were several factors. The original was the work of several hands, impelled by minds which were not always in harmony. The whole of the book was published some years ago, and the first part of it, if we mistake not, as long ago as 1897, and in a science so progressive as hæmatology, this means that much of the original must of necessity be antiquated; and again, all that part of the work for which Ehrlich is directly or indirectly responsible is deeply tinctured with his own views, some of which do not now meet with universal acceptance. Be it said at once that Dr Stengel has overcome these difficulties extremely well. The additions which he has made are, on the whole, sufficient to bring the work nearly up to date—for no book on hæmatology can hope to be quite abreast of knowledge—and yet they are so chosen and so inserted as not to mar the sequence of thought of the original author. The most satisfactory sections in this respect are those on pernicious anæmia,

chlorosis, and the leukæmias. From the nature of the subject, the original had to take the form of an academic description, and it has been comparatively simple to make the necessary additions. Some of these are very valuable; for instance, the account of the X-ray treatment of leukæmia and the description of chloroma. But it is annoying to find Lorrain-Smith's important work on the volume of the blood in chlorosis, with its far-reaching possibilities, dismissed in a few lines, while one is compelled to wade through a valley of dry bones of dead and gone theories. It would be easy to point out many omissions in these and the other sections, but it would hardly be fair, because, after all, the editor has not been making a new book, but doing his best with an old one.

But with regard to the section on the histology of the blood, Dr Stengel has evidently and wisely felt that it was best to interfere as little as possible with the original. To introduce discussions of all that has been said and done since Ehrlich wrote it would be to spoil its value as a historical document and a fine piece of medical literature, without necessarily making it a useful description of present-day views. The editor has been content with adding only what was absolutely essential, but we are afraid that to those who are not familiar with the original, the additions will give a look of up-to-dateness which the article in reality does not possess, valuable though it is.

Recurrent Effusion into the Knee-Joint after Injury, etc. By Sir WILLIAM BENNETT, K.C.V.O., F.R.C.S., etc. London: Longmans, Green & Co.

Is the reprint, with very slight alteration, of the report of a clinical lecture published in the *Lancet*. One is now faced by a neat, well-bound volume of sixty pages, barely twenty-eight of which are occupied by the subject-matter, set down in clear large print, with good illustrations. The analysis of 750 cases results in a confirmation of the teaching set forth in any good modern text-book. We quite agree with Sir William Bennett when he draws special attention to the fact that apparently insignificant injury often brings about serious interference with the function of the knee-joint, and when he condemns the trans-patellar incision in the treatment of internal derangements. While his remarks on malaria and the period of adolescence as etiological factors in the occurrence of recurrent effusions into the knee-joint are interesting and more original than the rest of the book, we do not consider them tempting enough to recommend the payment of 2s. 6d. for this reprint.

The Effects of Tropical Light on White Men. By MAJOR CHAS. E. WOODRUFF, A.M., M.D., Surgeon, U.S. Army. Pp. 358. New York and London: Rebman, Limited. 1905. Price 10s. 6d. net.

THIS book embodies the results of the author's work undertaken to prove, or disprove, Von Schmaedel's theory that the skin pigmentation of man was evolved for the purpose of excluding the actinic, or short, rays of light.

As a result of wide research, the theory is held to be conclusively proved, and in support of this opinion many most interesting facts are adduced. It may be stated at the outset that while the book is well worth perusal by medical men practising in the tropics, and is calculated to open out for them a broader view of the etiology of tropical diseases, it is to the anthropologist it will specially commend itself. The results of the migration of blond races, the evolution of blondness, the results of insufficient pigmentation, and even the effect of pigmentation on the form of religious belief, are very fully discussed, more than half the book being devoted to these subjects; and the conclusion reached that the blond races, owing to their deficient pigmentation, are not adapted for life in the tropical zone, and that all attempts at colonisation must of necessity result in failure, owing to the rapid deterioration due to the evil effects of sunlight.

While the author is apparently inclined to attribute many tropical ailments to the injurious violet or ultra-violet rays, we are glad to see he refuses to accept King's theory that the beneficial effects of methylene blue, quinine, or other drugs used in the treatment of malaria, are due solely to the effect on the malarial parasite of the violet light produced.

There is a very good chapter on Actino-therapy, which will be of interest to those engaged in this work. Infra-red, ultra-violet, X-ray, and negative actinic therapy are very fully described, and the limitations of this form of treatment are concisely stated. From the section on Light-Baths in Anæmia, it is to be inferred that the increase of iron in the blood and the increase in the number of red blood corpuscles found at high altitudes is due, not, as is generally held, to the diminished atmospheric pressure, but to the fact that "there is more ultra-violet than at lower levels."

Many of the statements in the book regarding the natives of the tropical zone show that they are made either from hearsay or from a study of a very contracted portion of the zone.

In the chapter on "Rules for White Men in the Tropics," some sound advice is given for the preservation of health in hot climates, but many of the views expressed are at variance with

those held by others with great experience. It is surprising to learn that the author is "opposed to any calisthenics and outdoor sports indulged in for the sole purpose of increasing the musculature," and considers athletic contests should be abolished in the tropics.

It is evident that much of the regrettable loss of life among the Americans during their occupation of the Philippines has been due to their inability to adapt themselves to their new surroundings. Much might have been learned from a personal study of the measures successfully adopted for the preservation of health by other blond races in the tropics. But perhaps, as was once said of the officers of a distinguished British regiment in India, "They knew nothing, and were too proud to learn." This is probably what the author means when he states, on p. 329, that "Americans are a queer lot."

Major Woodruff is to be congratulated on the production of a highly original work, which will be read with interest by all who desire to learn something of the conditions of life in the tropics.

Recherches Cliniques et Thérapeutiques, sur l'Épilepsie, l'Hystérie et l'Idiotie. Compte-rendu du service des enfants idiots, épileptiques et arriérés de Bicêtre pour l'année 1903. T. xxiv. By Dr BOURNEVILLE. Pp. clxxxiv. + 346, 72 figs. and 17 plates. Paris, 1904. Price 6 F.

M. BOURNEVILLE'S annual volume contains, as usual, a large amount of interesting and valuable work.

The first part comprises the report of his institutions for the year 1903. In it we have, in addition to the ordinary details and statistics, a full and well-illustrated account of the various ways of treatment employed in different kinds of cases. There are, for example, a series of illustrations showing the way in which many lower grade idiots, who seem at first incurably helpless, may gradually be improved. They are encouraged first to use their limbs in swinging themselves, then to maintain themselves in the erect posture, to walk with support, and so on. The improvement which results is sometimes so satisfactory that the children are able in time to be removed into a higher division of the school. There is also a long and valuable paper, by MM. Bourneville and Boyer, on the best ways of improving the speech in idiot and backward children in whom it is defective.

The second part contains a series of sixteen papers of various sizes, by M. Bourneville and his assistants. The first and longest of these is on the various kinds of dwarfing, and their treatment

by thyroid. He deals with simple dwarfing from arrest of development, dwarfing with infantilism, with obesity, and with rickets; also dwarfing with Mongolism, with myxœdema, and with diplegia. He has found increase of growth in Mongols as well as in Cretins, although to a less degree.

Another of the longer papers is by M. G. Paul Boncour, and describes the changes in the form of the cranium, which result from unilateral cerebral atrophy.

M. Bourneville deals shortly with the question of the influence of alcoholic habits in the parents on the production of idiocy and epilepsy in the children. His results are rather striking. Among 2987 cases investigated in this respect, 1207 were ascertained to have had one or both parents intemperate; 1290 came of sober parents; while the information as to the remaining 490 was deficient.

Golden Rules of Medical Practice. By LEWIS SMITH, M.D. Sixth edition. Pp. 126. Bristol: John Wright & Co. 1905. Price 1s.

WE confess to having felt sceptical about the utility of a book on the practice of medicine whose dimensions are rather less than 4 by 3 by ½ an inch, but after reading it we can cordially recommend it. It is eminently practical, and a perusal of it might save an inexperienced practitioner from many pit-falls. Even to that superior person, the house-physician, we commend this little book. It may not teach him much about details of diagnosis, which, after all, he may leave to his chief, but an acquaintance with its rules regarding such conditions as coma, for example, should go far to help him to avoid those errors in the out-patient room which are sometimes so eagerly exploited in the lay press.

The author states his points clearly and forcibly, and the book is cheap at a shilling.

Fourteenth Annual Reports (Year 1904) to the County Councils of Stirling and Dumbarton. By J. C. M'VAIL, M.D., D.P.H. (Camb.), F.R.S.E., Medical Officer of Health. Glasgow: Wm. Hodge & Co. 1905.

THESE reports are drawn up on analogous lines, and deal in large measure with the same subjects. In the arrangement of the contents of both these reports, Dr M'Vail has reverted this year to the scheme which last year was superseded, and has devised a method of co-ordinating it with the new Regulations of the Local Government Board.

The Circular of the Local Government Board on School Closure in relation to Infectious Diseases, issued in 1904, is discussed in connection with the practical experience of such diseases among school children. It is shown that the School Authorities are occasionally anxious to have a school closed, and, having obtained this, are sometimes desirous of re-opening it too soon.

Owing to the possible introduction of ankylostomiasis among the miners of this country, the Home Secretary issued a circular letter on the subject to all County Councils. Since it appears that a temperature of at least 69° F. is necessary for the development of the larvæ, Dr M'Vail instituted an inquiry into the temperature prevailing in the mines in his district. It was found that the collieries in these counties seldom possess so high a temperature, so that the danger of this disease becoming prevalent in these mines is comparatively slight.

Stirlingshire.—The year 1904 exhibited a marked diminution in infectious disease, more especially in the case of scarlet and enteric fevers. Smallpox, however, prevailed to a larger extent than usual, and gave additional trouble to the Medical Officer of Health in the absence of a County Hospital set apart for this disease. Dr M'Vail relates the history of unsuccessful attempts to provide such a hospital by joint action of the various Local Authorities. No vaccinated child under 14 years of age was attacked by smallpox, and the protective effect of recent successful vaccination was illustrated in a picturesque manner in the case of an infant, whose mother took the disease and was removed to hospital. The child accompanied its mother to hospital and was suckled by her, but did not take the disease. The report presents numerous tables as to various rates in the County and in its separate Districts. It is noted that the decline in the birth-rate continues, but this is not a feature peculiar to Stirlingshire. Owing to a small error in the calculation, the birth-rate of the Western District is given as 21.048, but should be 21.92. From this, and other Scottish reports, it is evident that the ventilation of many schools in the country is defective, and this subject will probably demand general attention in the near future.

Dumbartonshire.—An epidemic of enteric fever occurred at Knightswood, and was ultimately traced to infected milk from another county. The account of the epidemiology of this outbreak is very well related, and, though specific infection was not traced, the milk contained bacterioscopic proof of excretal contamination. Details are given of an extremely interesting observation on the ammonias of the peaty water of Fannyside Loch and its feeders. The free ammonia is in excess of the

albuminoid ammonia, and there is no possibility of sewage contamination of either feeders or loch. While the free ammonia stands as high in the feeders as in the loch, the albuminoid ammonia is distinctly greater in the former than in the latter. Laboratory investigation of these waters would materially increase our knowledge. The ventilation of sewers by means of special shafts, instead of manholes, is advocated where the gradient is defective or the manholes are in a faulty situation.

Dr M'Vail is to be congratulated on the issue of these instructive reports, which are of great practical value.

Fourteenth Annual Report of the Medical Officer of Health for the County of Fife. By THOMAS GOODALL NASMYTH, M.D., D.Sc., D.P.H., F.R.S.E. Year 1904. Pp. 115. Cupar-Fife: J. & G. Innes. 1905.

THE County Council of Fife may regard with general satisfaction the sanitary condition of the districts under their charge during 1904. The year proved a good one, with a moderate birth-rate, a low death-rate, and no serious outbreak of infectious disease. There was much less enteric fever than in the previous year, the cases of scarlet fever were also fewer, and smallpox did not spread beyond a few isolated cases. Nevertheless the occurrence of an increase in the incidence of diphtheria should emphasise the importance of attention to the sanitary conditions of the schools. It is evident from Dr Nasmyth's report that many of the schools in Fife are defective in hygienic requirements. Their improvement would, by the prevention of disease among the scholars, probably well repay the necessary outlay. A most interesting portion of the report deals with the occurrence of enteric fever at Pittenweem. The medical officer for the county has no difficulty in showing that there was no evidence to connect the outbreak with a dairy farm in the county, and that the cause was more likely to be found within the burgh itself.

The report bears evidence of much useful work, and Dr Nasmyth is to be congratulated on the labours of the year. Many of the water analyses are now undertaken in the County Laboratory, and the results are included in the report, together with the customary tables of vital statistics, and of inspections by the Sanitary Inspector and the Medical Officer of Health.

All Communications—including **BOOKS** *for* **REVIEW** *and* **EXCHANGE JOURNALS**—*are to be addressed to* THE EDITORS, 7 *Manor Place, Edinburgh*, AND NOT TO 43 CASTLE STREET.

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RELIGIO OBSTETRICI

A Farewell Graduation Address, 28th July 1905

By PROFESSOR A. R. SIMPSON

LADIES AND GENTLEMEN, MY FELLOW-GRADUATES,

I bid you welcome to the ranks of an honourable profession. As I have had the privilege of presenting you for promotion to the Vice-Chancellor, it falls to me on behalf of my colleagues and myself to offer you our warm congratulations on the possession of degrees which you have earned by your intelligence and industry, and to bid you God-speed as you enter on a new phase of your career.

ANTICIPATIONS.

When this ceremony was in process a year ago, various thoughts passed through my mind. Looking forward to to-day, I thought if I still had a place on this platform it would be my lot to serve for a third time as Promoter of the graduates. Further, when the Bachelors of Medicine were entering their first graduation year, the promoter would be entering the year of his graduation jubilee; seven times seven summers having passed over my head since, with eight and sixty other men—"sweet girl graduates in their golden hair" were as yet but shadows in a poet's dream—I passed before the venerable Principal Lee to be capped, and to hear him say, *Te medicinæ doctorem creo.* Again, I kept thinking that the Colleague who was the promoter of the day would be an ideal Dean for the Faculty of Medicine, and that it would be for the interests of the University that I should let the office pass to the keeping of Professor Cunningham. Moreover, having heard from time

to time as I passed along the Infirmary corridors a sound as of the grinding of an axe that was to be laid at the root of certain trees, I judged that the tree that counted seventy rings beneath its bark would be the first to feel its edge. The woodman, meantime, spared that tree. Still, I recognise that they who would set an age-limit to the tenure of such a Chair as mine are amply justified. There is always risk that the ageing incumbent of a Chair may become an incubus upon it. I could not bear to dree that weird. Accordingly, I have carried out another thought that was in my mind. I have resigned to the charge of the University Court the commission with which the Curators entrusted me on the 4th of July 1870. For, though I be not breathless yet, I judge that after a course of five-and-thirty years, it is fitting I should hand on the torch of Midwifery in the University to an after-runner, who may carry it over with brighter glow to another generation.

RESIGNATION.

It is not without a pang that I pass it on. Whether we have regard to principles or practice, my department of medicine yearly grows more intensely interesting to the scientific explorer, more urgently important for the general practitioner. Problems that have wrinkled the brows of the wisest through half a millennium are finding their solution now: operations are daily faced with confidence to-day, from which half a century ago the boldest held aloof.

Progress becomes more and more rapid because of the increasing facility of international commerce. The great community of the devotees of Lucina knows no limit of race or tongue, and what is discovered anywhere is swiftly made known everywhere. Hence a multiplication of periodicals that beats one to keep up with. Not to speak of writings in our own language, when I began to lecture there was one obstetric journal recently started in German. For some years I have taken in four, besides looking at two others in the library, and seeing special papers in general medical magazines. In French, in 1870, I knew of no special journal in Midwifery: now there are at least four from Paris, besides bulletins of two societies. For some time I have had three Italian journals coming to me,

besides that I see another in the library. A society in Bucharest sends me its transactions, written not in Roumanian, happily, but in French; and even whilst Russia and Japan are in deadly conflict, our Russian and Japanese brethren continue to make contributions to our literature. I refer to these accumulating publications as an evidence to you of the rapidly growing extent and interest of the themes that have to be dealt with from a Chair of Midwifery, and as an excuse to myself for wishing to see this—the oldest Chair of Midwifery in the world—freshened with the energy of a younger occupant.

The enormous and rapidly extending progress which it has been my delight and my duty to follow out in one department of the healing art is in line with what has taken place in all the subjects embraced in your curriculum, and has been attended with changes in the training of entrants on the medical profession, to two of which I shall advert.

A MEDICAL APPRENTICE.

When I began to study, the system of medical apprenticeship had not quite died out. Some of my fellow-students were apprenticed to Professor Spence, who was at that time an extra-mural Lecturer on Surgery. I had myself the singular good fortune to be apprenticed to Professor Goodsir. The relationship did not, I confess, help me much in learning to cure disease. He sometimes had me with him in a curiously constructed two-wheel carriage of his own designing, something like a hansom, hung low on the axle, and turned the other way, so that you entered from behind, and sat looking backward. But the only patient whose case remains in my memory was that of a lady with chronic ulcers in the leg, that he set me to dress daily with Red Wash. Healing was going on but slowly till, with the advice of my uncle's then assistant, Dr Drummond, I changed the Red for Black Wash; and when it occurred to my master to enquire, after some weeks, how the sores were getting on, I could report them nearly well. But the apprenticeship did me this good service, that it gave me opportunities for much dissection, and so for acquiring a facility in the handling of forceps and scalpel that has been a life-long benefit. What was of still greater moment, it brought me under the spell of a

man of genius, who was a tireless toiler, and who sought in all his own researches and the work of his assistants what he called "God's truth." When I bade him good-bye, on taking my departure for the Continent after graduation, he gave me introductions to Johannes Müller and Professor Arnold, and some hints as to the best use of my time. He ended by saying in his slow, emphatic way, "There's another thing, Mr Simpson. See that you go regularly to church every Sunday." I think my eyes must have asked him if he feared I might be a scapegrace, for he added with a smile, "There's no better way to learn German."

I do not know of any survivor among those of my fellow-students who were apprenticed to Professor Spence, and I expect that the last of the Edinburgh medical apprentices will be buried in my grave.

EXIT APPRENTICESHIP: ENTER EXAMINATIONS.

You know by distressful experience — and so do your examiners—how the examination system has grown up among us till it has become a multiplied misery. So much so that when, some years ago, I wrote to the wife of our late M.P. that a sixth son had been born to me, Lady Priestly replied, "Six sons. To think what that means in examinations!" This increase in examinations has become a necessity, very much because of the extension of all the subjects of study and the attendant specialisation and development of new departments. When you were attending the Arts Classes or preparing for your Preliminary Examination, you witnessed the genesis of a new Chair by a process of fission that took place in the organism of Medical Jurisprudence and Public Health. You may, without great stretch of imagination, conceive it possible that Sir Henry Littlejohn's predecessor might on occasion lecture for the Professor of Materia Medica, when you are reminded that Sir Douglas Maclagan was promoted from the extra-mural Lectureship on Materia Medica to the Chair he so long adorned, and that during most of his professoriate he served with four of his colleagues as an Infirmary Physician and Professor of Clinical Medicine. But will you believe me when I tell you that I have heard his predecessor, Professor Traill, lecture on Natural History—a subject that since his day has also fissioned into the two separate Chairs of Zoology and

Geology? There were giants in those days. But I leave you to judge how far it was due to the wide range of their capacities, or to the narrow range of the medical disciplines, that it was possible for one professor thus to take another's place. Professors were sometimes translated from one Chair to another. When Professor Alison resigned the Chair of Practice of Physic in 1855, Sir James Simpson was urged from various sides to become a candidate. I heard a leading member of the Town Council—one who had signed his commission to the Chair of Midwifery in 1840—assure him that he would be elected if he stood for Alison's Chair. The coveted seat was won by a general practitioner from York. On the afternoon of his election, Professor Laycock took from his vest pocket his silver lancet-case and made me a present of it, saying he would now have no further use for it. Dr Alexander Wood, who was second in the running, and only lost the Chair by a single vote, had no place in the Infirmary. He was one of the Maternity Physicians, and was so vexed with Sir James for supporting the claims of Professor Bennett and Dr Laycock in preference to his own, that he spoke of starting an opposition class of Midwifery. You needn't be surprised, therefore, that Professor Traill could undertake a week's work in the Natural History class-room, for that versatile gentleman was reputed to be prepared at short notice to take the place of any of his colleagues who might be ill or absent—only drawing the line at the blood-shedding class of Clinical Surgery.

ARCHAIC EXAMINATIONS.

Hence you will the more easily comprehend how it was possible for me to reach the stage in my medical career at which you have this day happily arrived, with no severer strain than was implied in two written examinations of two days each —one at the end of my third and the other at the end of my fourth and final session. There was, indeed, an oral examination administered to four of us on the second occasion. But it was of the simplest. Of the tables placed in the Court-Room for the six subjects of the final examination, I was first set down before that of the Professor of Pathology. Professor Henderson told me that two of the questions had been

answered well enough, but that the third was all wrong. When a word or two showed him that I had misunderstood the question, he said that several other candidates had made the same mistake and passed me on to Professor Traill. That admirable gentleman told me that he would have put a higher value on my exercise if, like my companions, William Playfair and John Somerville, who were being interviewed at the same time at other tables, I had taken pains to copy on the margin a diagram, with which his lectures had been illustrated, showing a cross section of the *cloaca maxima* in Rome. So they let me go. But I had almost forgotten my preliminary examination. It was in Latin: my examiner, Professor Syme. In the Latin class-room he put a copy of Virgil in my hand, and when I had read and translated a dozen lines in the Æneid he was satisfied. So was I. That he was not a very hard examiner you may guess when you hear that he passed another lad from the country who fairly broke down and began to shed tears, as he was trying to toil through the lines that tell how Achilles in his chariot dragged the dead body of Hector by the heels round the walls of Troy. Syme encouraged him to go on, saying, "But why should you cry?" The candidate answered, "Oh Sir, I'm wae for Hector."

THE GRADUATE'S HORIZON.

When you compare your own experiences with these which must appear to you primeval, you will begin to see that stupendous changes have swept over all the fields of Medicine during the intervening half century. You will know that in the pursuit of your profession your mind will be kept engaged with themes of perennial interest, and your present attainment will be an incentive to further effort. And, because your diploma bears the honoured seal of a great university, you will never forget that the range of your interest is not confined even within the expansive bounds of Medicine, but has a horizon co-extensive with the Universe.

"YET ONCE"—"YET ONCE MORE."

Now, the era I have spanned has been one of those "once more" epochs which the Hebrew mind has taught us to discern,

when we see the Supreme Power "shake the heavens, and the earth, and the sea, and the dry land" (Haggai), "that those things that cannot be shaken may remain" (Epistle to the Hebrews). I do not know in what mood of pessimism I might have stood before you to-day had it not been that ere the dew of youth had dried from off me I made friends with the sinless Son of Man, who is the well-head of the stream that vitalises all advancing civilisation, and who claims to be The First and The Last, and the Living One who was dead, and is alive for evermore, and has the keys of Death and the Unseen. My experience compels me to own that claim. For to me, as to the Reformers who founded this University, and to a countless throng throughout the centuries of all sorts and conditions of men, He has established a vivid and vivifying correspondence with our super-sensuous environment. He has made us "see" that at the heart of all things there is a Father's heart. He has made us "know" that in the complex play of circumstances the reins of progress are in the hands of a Circumstant who makes all things work together for our good. Held by His pierced hand, I have witnessed on my way through the shifting panorama of a shaking time some tremendous transformations. These have taken place under the influence of two factors. There is, *first*, the extended range of observation that has been opened to sense, largely by electricity and the spectrum; and *second*, the guidance that has been given to imagination by the doctrine of Evolution. The outer man has acquired instruments of precision, the inner has been given a clue to guide him through the maze of thought. As Science has been seeing more clearly into the constitution and course of things, Philosophy has been able to give a clearer interpretation of their meaning. Let me try in seven paragraphs to reproduce and throw on the screen of imagination some of the transformations I have been made to see.

A PHYSICAL TRINITY.

1. There has emerged from the laboratory of the latter half of the century a luminous trinity. When I first heard of Ether, it was as of a finer air around our atmosphere that came to us rippling with the rays of light. You have been taught

to think of it as the something which no man has seen, and that yet fills all space, is present in all things, and holds all in its embrace. This basal postulate of modern science is arrived at from the study of Matter, which in its ultimate analysis is ether becoming embodied, and which in its turn displays itself under the influence of the third member of the trinity that we recognise as Power or Energy. When I attended a class of Physics, we were told of various forces which were each distinct and capable of producing their specific changes. In 1862, the wife of an Anglican dignitary rewarded me for such attention as an assistant may give to one of his master's patients, by giving me a copy of the fourth edition of Grove's "Correlation of Physical Forces," a work that marked the transition from the age of diverse powers at work in nature to the conception of one continuous energy with varied operations. If I lengthen this paragraph by adding that our text-book in geology was written by Sir Charles Lyell, who was then leading the Uniformitarians in their battle with the Catastrophists, and leading them to victory, and that at his side rose up Charles Darwin to replace the intrusionism that had reigned in biology with the more thinkable theory of evolutionism, you will see that it is now as impossible for my mind to be satisfied with the thoughts that suited it in my student days, as it would be for my body to put on the jacket I laid aside when as a boy of fifteen I left school for the University.

THE EARTH GROWN OLD—

2. I have seen the earth grow old. Brought up to believe that it had been in existence only some six thousand years, I know to-day that its age is to be reckoned by thousands of thousands, not of years, but of ages.

—AND STILL IN THE MAKING.

3. We believed that in six days out of chaos it had been given its final form and furnishing. If one poet could sing how all "at once the lion and the worm sprung from the teeming earth," another could picture the lion as he emerged rampant from the clods, "pawing to get free his hinder parts."

The mountains passed for everlasting, and time wrote no wrinkle on the ocean's brow. You have arrived on a planet that is still in the making. From some nebula in the far dateless past your world has slowly taken shape and course among other worlds, whose interstellar spaces the photograph shows you to be full of stars unseen by earlier generations. Not the sea only but the solid land, all that is of them, and all that is in them and on them and in the air around, are subjects of incessant change, till we can project our thoughts to a far off future, when all may be resolved again into the mist from which could be evolved another cosmos.

THE ELEMENTS DISSOLVED.

4. The very constitution of the world has changed. In the Chemistry class-room, in 1852, a printed board showed a list of the several elements of which the material world was made, with their atomic weights. We were told that some of these might yet be decomposed and their number added to. But we were also taught that whatever new elements might yet be found, they were each distinct and intransmutable, compacted of a crowd of particles of the last imaginable degree of minuteness—the atoms. The atom, the indivisible unit of matter brought from the very verge of thought to guide the chemist in his research, has itself been atomised, and presents itself to us now as an object built up of many parts. It is no longer a solid block, but an edifice—a laboratory if you will—into which we can go and see business transacted among the multitude of ions or electrons where physics is feign to borrow the language of biology for its expression. We seem to ourselves to have come into the borderland where the homogeneous first becomes heterogeneous, where the invisible takes on visibility, where ether clothes itself with matter, and where we are definitely told we may see the mutation of one element into another, so that when we have entered an atom that bore over the entrance the sign of a radium workshop we emerge by a door called helium.

PARTHENOGENESIS OF LIFE.

5. The unit of biology has also been transformed. The cell was becoming visible under the microscope about the time

when I was born. My master, John Goodsir, was one of the first to see and state its place in the economy of nature. Another of my teachers, Rudolf Virchow, gave currency to the doctrine of *omnis cellula e cellulâ*, especially through his epoch-marking work on Cellular Pathology, which was "Englished" by a man who listened to his lectures at the same time with me. For a generation the cell, with its wall and its contents, its nucleus and nucleolus, its dividings and its differentiations, was the ultimate object of research and reasoning for the biologist. It has not abjured its dignity in the category of thought and observation. But we see the simplest expression of life to-day in a speck of life-stuff that we call bioplasm. In thought we pass with ease through the cell wall to look more closely at its kernel. Right into the substance of the nucleus we press and see threads of a life-web resolving into chromosomes, which hold and can transmit the peculiarities of various forms of life. And the plasm dot of a chromosome again resolves itself into ids and biophors with their determinants, till we may well imagine we have come into a vast cathedral, from whose roof there echoes to us the sound of the voice of one of our brethren of the centuries B.C., of whom Addison tells us that he called his treatise on Anatomy "a hymn to the Supreme Being."

THE CONTINUITY OF LIFE.

6. It is here, perhaps, that we find the most thrilling of all the transformations that have taken place in the thoughts of those who have the gift, the right, and the responsibility to think. Man, "servant and interpreter of nature," soaring among the stars to analyse their elements, or searching out the secrets of the atom and the cell, has found himself an item in a social cosmos, subject throughout all its bounds to the reign of law. A composite being, formed of the common elements and capable of communing with the Spirit who has not, at any time, anywhere, among any people, left Himself without a witness, he finds that there is nothing alien to him in all the universe. Standing on the summits of creation, summing up in himself the last results of the long processes of evolution, he looks to find his ultimate home in One who is from everlasting

to everlasting God. He is the more encouraged to such lofty ideal when he traces his genealogy back, away back to where the foundations of the earth were laid. His mind reflects the mind that fashioned its materials, and somewhere among the ions and the biophors, where he can scarcely tell whether the ion is not already instinct with more than electricity, or the biophor holds less than life, he sees the narrow fissure between the unseen and the seen, between the not-living and the living, bridged by a kind of virgin-birth, with repetitions of which in some form natural science will make him familiar as he traces the various stages in his own evolution. For parthenogenesis is found not only among the early forms of life, where the distinction between plant and animal is hard to decipher, and where the non-sentient is passing into the sentient, but again and again at transition pages in the evolution story, where we see changes taking place in the types with which the record has been written.

THE INDIVIDUAL LIFE.

7. Each individual from out the race is set before himself distinct from all, yet consociate with all. Our first sight of our individual selves, as we emerge upon the field of being, is as a microscopic speck of protoplasm. It may not differ in appearance or in composition from such another speck as would grow into a creature of another kind. It may resemble the creatures we call protozoa, because in the school of life they have never gone beyond the alphabet. But it possesses the attribute common to everything that lives, of taking into itself what it finds needful from its surrounding elements. Let it respond to the impulses, the claims, of its environment, and use the matter it assimilates to grow or multiply, and it will live on; it will develop and reproduce according to its kind. Let it at any stage of its history begin to assimilate for assimilation's sake, and it is ready to die; or worse, it may degenerate. The microscopic morsel of germ-plasm out of which any of us grew was one of a cityful of more than seventy thousand primordial ova, only four or five of which were selected to pass through evolutionary processes, that recapitulated at various stages the history of their pre-human

genealogy, before they came to claim a place in a nation's register. Each of the four, as his evolution still progresses, finds after he has come to himself, and so long as his self-consciousness abides, that the material part of him is subject to ceaseless change. He is continually putting off his mortal vesture and replacing it with a better fitting garb. The seven pounds weight of matter that was laid in the infant balance passes all away, every atom of it; and if he reach the Psalmist's term of threescore years and ten, he is told that, though he may not have noticed it, he has ten times changed the fabric of the frame his spirit tenants. If he be wise, he will long ere then have pondered how the last fashion of his vestment will be put off—whether in one way or another.

"NOT THAT I WOULD BE UNCLOTHED."

In one way. One of the heroes of my opening manhood, one of the most lovable of men, was so great a naturalist that when he died in his prime, Sydney Dobell wrote me a note suggesting these four lines for his epitaph:—

> "He courted Nature for his mistress; wooed her so
> He won her, till, by love made bold,
> She showed him more than mortal man should know—
> Then slew him, lest her secrets should be told."

A few hours before his passing a friend came to his bedside and asked him, "How do you feel now?" and was answered, "I feel just like a creature carried down a river."

In that way, or in this. When I went to practise in Glasgow the man at the top of the profession, though still in middle life, had resigned the Chair of the Practice of Physic in the Andersonian University, being somewhat delicate in health, and having reached that busy eminence where his fellow-citizens could not let their sick friends die till he had seen them, and where his professional brethren were not quite satisfied that Medicine had done its last and best till they had had a consultation with him. When Dr Andrew Anderson was on his death-bed, one of his fellow-elders, who was also ill, sent to enquire how it fared with him. "Tell him," said Dr Anderson, borrowing from Hopeful in "The Pilgrim's Progress,"

"Tell him I'm in the very middle of the river, but I feel the bottom and it is good."

It may chance that some July day far down the century, when I have long been in the ether, one or other of you will talk with child or grandchild of the years when the century was young. Among its unforgotten scenes there will rise before your mind the memory of the day when at last you burst the chrysalis shell of pupilage to lift free wings into the azure. You will recall the unusual concurrence of the simultaneous leave-taking of the University by the graduates and their promoter. "We came away," you will say to the child, "a goodly company, all together, through the gateway that leads to the rosy dawn. He passed out, all alone, through the door that looks to the sunset and evening star. He was an old man like me," I forehear you say. "Not in himself a great man, he had been a friend of great men, and came out of a great time in the nineteenth century 'when there was mid-sea and the mighty things,' and it looked to the men of his generation as if old things had all passed away and a new world begun. And he told us that the great lesson he had learned on his way through life was the same that the disciple who leaned on Jesus' breast at supper taught to the fathers, the young men, and the little children of his time, when He said, 'The world passeth away, and the lust thereof; but he that doeth the will of God abideth for ever.'" Farewell.

HARVEY AS A TEACHER

THE 123rd HARVEIAN ORATION

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My first duty is to thank you most sincerely for the honour you have done me in electing me to fill this chair, which has been occupied by so many of the best and ablest of Scottish physicians and surgeons. It is no light matter to follow in their footsteps—nor was it easy to hit upon a subject which would be at the same time interesting to the Society and within my powers of exposition. Several ideas presented

themselves, but I finally decided to go back to the fountainhead and discourse on the life and works of Harvey himself, because I found, on looking over the list of past orations, that only on four occasions during the last twenty years has this, the primary object of the Society's existence, been brought before you. The subject is a large one. There are several interesting biographies of him in existence, and his own writings, particularly those dealing with the subject of generation, are voluminous. But his work on the Heart and the Circulation, or to speak more accurately, his "Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus," has so far overshadowed his other contributions to science, especially in the popular mind, that one is apt to forget the immense labour and insight that he brought to bear upon other subjects, such as general anatomy of the human body, comparative anatomy and physiology, generation and development, and the many long epistles he wrote in defence of his doctrines and teaching. I can only hope in the short time at our disposal to-night to give you a brief sketch of his personal history and his achievements, devoting a special attention to his work as a teacher, as exemplified in his extant Lumleian Lectures.

William Harvey was born at Folkestone on April 1, 1578—just fourteen years after the birth of Shakespeare. He may therefore be ranked along with that brilliant band of scholars, poets, soldiers, and statesmen who adorned and illuminated the history of England at the end of the sixteenth and the earlier years of the seventeenth century. His father was a man of some position and influence, and his mother, if we may believe the inscription on her tomb in Folkestone Church, said to have been written by her most distinguished son, was a large-hearted, wise, and godly woman. Epitaphs are not always to be implicitly relied on, but we unhesitatingly accept anything to the credit of William Harvey's mother as a portion of our faith.

We know little of his early years, except that he was educated at King's School, Canterbury, and was entered at Caius College, Cambridge, in May 1593, and took his B.A. degree in 1597. Cambridge was at that time a school of divinity and philosophy and not of medicine, and the student of physic was obliged, as indeed he is at the present day, to obtain the principal part of his practical professional training at some

other school. He may, however, have had some teaching there in anatomy, as Dr Caius had obtained from Elizabeth, in 1564, a Royal Licence, which, among other things, granted that the college should have annually, "without the contradiction of any one, two human bodies for anatomy, condemned by law for theft or homicide and dying in the town, county, or castle of Cambridge; and that they may freely dissect them at their will, with the reverence due to the human body." Caius directed that these dissections should be made every year during the winter, and laid down stringent rules as to the reverent burial of the remains. There are a few records, but very few, that such dissections were ever made. But there was an office of demonstrator or Anatomer among the college lecturers; and there is a record, as early as March 12, 1566, that one "John Figgen was made anatomy at the schools and buried in St Mary's churchyard." This is said to be the earliest contemporary record known of the actual performance of human anatomy in England.

Whatever else Harvey may have gained at Cambridge, he carried away with him a deep love of learning, a fair knowledge of Greek, and a thoroughly accurate and intimate acquaintance with Latin, both classical and colloquial.

From Cambridge he went in 1598 to Padua, the school of Vesalius, where he learned anatomy in the class of Fabricius of Aquapendente, who gave him much help and became his warm friend. There is no record extant of his matriculation, but in the same year there matriculated there one Joseph Lister, described as "Anglus cum parva cicatrice in palpebra dextra." Fabricius was an earnest student of surgery and medicine, and especially of anatomy, and had observed, rediscovered in fact, the valves in the veins, though he had a mistaken idea of their uses, and was much interested in the subject of development. It is highly probable that it was his intimacy with this great man that instilled into Harvey's mind the love of dissection, and started him on the path of discovery by means of observation and research. He spent five years at Padua and graduated M.D. in 1602. The diploma is dated April 23 of that year, and it confers on Harvey the degree of Doctor of Physic, with leave to practise and to teach Arts and Medicine in every land and seat of learning. It further recites that he

had conducted himself so wonderfully well in the examination, and had shown such skill, memory, and learning, that he had far surpassed even the great hopes which his examiners had formed of him. In some of the foreign Universities these degrees could be purchased, at all events shortly after this time, for we read in Ward's "Diary" (1839), which extended from 1648-1679:—"Mr Burnet had a letter out of the Low Countries, of the charge of a doctor's degree, which is at Leyden about sixteen pounds, besides feasting the Professors. At Angers, in France, not above nine pounds, and feasting not necessary neither." Armed with this highly flattering diploma he received the M.D. degree at Cambridge in the same year, and shortly afterwards settled in London and married in 1604. Nothing is known of his wife except that she was a daughter of Dr Launcelot Browne, who was physician to Elizabeth and James I. She had no family, and died about 1650.

He now settled down to practice; but, as there was probably at first not much of that to do, he spent most of his time in dissections and observations, and it is stated that he dissected upwards of eighty different kinds of animals. He became a F.R.C.P. in 1607, and was appointed Physician to St Bartholomew's Hospital in 1609. It may be remarked in passing that the work which a Hospital Physician in these days had to do was totally different from that of the present day: it had much more resemblance to the visits made to a dispensary or poorhouse.

In the "Charge" defining the duties of the office, he is ordered "one day in the week throughout the year, or oftener as need shall require, you shall come to this Hospital and cause the Hospitaller, Matron, or Porter to call before you in the hall of this Hospital such and so many of the poor harboured in this Hospital as shall need the counsel and advice of the physician"; and it goes on to adjure him in "God, His most holy name," "to give the best of his knowledge as a physician to such poor, and to any that may be sent to his house, to prescribe only good and wholesome drugs, and to take no fee or reward."

His connection with St Bartholomew's lasted about 35 years. He was finally ousted by the Parliament not long before the death of Charles I.

We may ask, What manner of man was Harvey at this time? He is described by Aubrey thus:—"Harvey was not tall, but of the lowest stature; round-faced; olivaster complexion; little eye, round, very black, full of spirit; his hair black as a raven and curling, but it became quite white twenty years before he died. In temper he was very choleric, rapid in utterance, and much given to gesticulation."

A few years later, in 1615, he was appointed to the important office of Lumleian Lecturer in Surgery and Anatomy which he retained for forty years. This Lectureship was founded in 1581 by the munificence of Dr Cudwal, President of the R.C.P., and Lord Lumley, who laid a rent charge on their lands to the amount of forty pounds a year to pay the Lecturer. It was first offered to the Barber Surgeons, but was by them refused, but was accepted gladly by the R.C.P. The lectures were delivered twice a week throughout the year, partly in English and partly in Latin. Here Harvey found the opportunity of his life, for, beginning on April 16, 1616, one week before the death of Shakespeare, there is no doubt that he at once began to teach part, at any rate, of his doctrines on the circulation of the blood, on which his undying fame rests, though he did not publish his Treatise until 1628. The manuscript notes of one series of the Lectures are still extant, and have not long since been printed in facsimile, with a copy in good type of each leaf on the opposite page.

These notes have an interesting history. They were acquired, we know not how, by Sir Hans Sloane, and were bought by the nation, with the rest of his collection, in 1753. They were seen by one of Harvey's biographers in 1766 and then disappeared until 1877, when they were found again among some printed books in the British Museum. The edition of them which you see was undertaken by the London College of Physicians in 1885, at the instigation of Sir Edward Sieveking. The task of deciphering them must have been a difficult one, for Harvey wrote a very bad hand, even for a doctor, and many of them are full of contractions, abbreviations, suggestions for headings, and the quaint introduction of occasional English or Greek words. Moreover, there are comparatively few complete sentences and no punctuation, with the exception

of an occasional full stop. In fact, they are just such notes as you would expect from a busy man full of knowledge of his subject and anxious to jot down the points and arrangements of the course, with illustrative cases, just indicated often by a word or note, with which he meant to enlighten the lecture.

They were obviously intended for no eye but his own, and herein lies their great value; for they show us just how the mind of Harvey worked—the careful and accurate way in which he divided and subdivided the subject-matter of his course; his very full knowledge of the writings of ancient and modern anatomists, and the extraordinary abundance of his own observations in human and comparative anatomy. There are said to be allusions to some part of the anatomy of upwards of 80 different animals throughout the course. The anatomical details, moreover, are pointed and enriched by allusions to many cases which had come under his notice in his own practice and that of others which he had seen; and he mentions a good many names of patients in connection with their diseases —such as Sir William Rigden, Lady Croft, Sir John Rigby, Joan Johnson, Mr Benton, John Bracey, and many others. That he was a good clinical observer there can be no doubt; and had he left no other record of his professional work, we could learn from these notes how varied his experiences had been. Thus he compares the desquamation after scarlet fever to the shaking off of the feathers of a bird during moulting. He had noted that the liver was sometimes greatly enlarged after a prolonged suppuration. He was familiar with cirrhosis of the same organ, and its results; and he has described gall-stones and the icterus and white stools which they bring about. He remarks that a disordered stomach affects the head like a motion from the Lower to the Upper House. He has known of cured (curavit) ulcers in the prostate and penis, and says that ulcers often spread from the cervix uteri into the rectum and anus—with the striking comment, "Miserrimæ"—and has noted that bending of the womb sometimes interferes with the introduction of enemata.

In discussing the subject of a full bladder, he remarks that it reaches above the pubes, and that some think that this is the place for cutting for the stone, but with this view he does not agree. Again he notes that nothing is more intolerable than

an old ulcer of the bladder: "those who suffer from it wish for death." Of the stomach he remarks: "Communissima pars venter et nullum absque, ab invisible fly to the elephant." And he seems to have observed, though he did not recognise the cause, an extra-uterine gestation, for he says: "I have seen the whole blood of the body escaped into the abdominal cavity through a tear at the cornua uteri." The sac of a hernia into the scrotum, he says, must be constricted, firmed up or tied. He has many allusions to syphilis and the destruction it causes, as well as to phthisis and its appearances in the living and the dead. In dealing with the skull, he notes the differences in thickness of the bone in different parts, "unde cautio in trepanning."

We see also from these lectures who were Harvey's scientific and professional heroes. Aristotle he always speaks of with reverence, and though he sometimes disagrees with his opinions, it is always with some diffidence; unless, indeed, it be in any matter of direct observation, when he firmly holds his own. Fabricius, Galen, Fallopius, Vesalius, Columbus, are frequently quoted, not always to their advantage. To a remark of Laurentius on a certain subject, who says, "Amentes qui non credunt," "Ego Amens," he says. Of the modern and contemporary writers he quotes from Dr Williamson, Dr Argent, and others. He shows a close familiarity with Holy Writ, and had some knowledge of the Latin Fathers. Among the classical Latin writers he was at home with Plautus, Horace, and Cicero, as well as with his prime favourite, Virgil.

In fact, as Dr Norman Moore, the editor of this work, eloquently says:—"The lectures show Harvey to us at his books, seeing his patients in their beds, examining them post-mortem, talking with other physicians, listening to the phrases of the people, and watching their sports; and lastly, they give a picture of him, as no carefully prepared work could, delivering his lectures with a body dissected on the table before him, and a demonstrator who lifted up or exposed this or that part at his bidding. Harvey never tries to appear learned; his whole aim seems to be to make the subject clear. There is no affectation; every remark has the stamp of his own original, thoughtful, observing mind."

As these lectures are less known than most of Harvey's other writings, it seemed to me that it would interest the Society if I went into some detail in regard to them. Harvey entitles them "Observationes Anatomiæ Universalis," and uses as his motto, "Stat Jove principium, Musæ, Jovis omnia Plena" —an idea he was very fond of—taking Jove in this place to mean the Creator, the all-wise, Nature. He lays down early in the course his canons for the teaching of anatomy—they are in mixed English and Latin, but may be stated thus:—

1. To show as much as possible of the part of the body you are treating of at once, and afterwards to subdivide the parts according to their positions and relations.

2. To show anything that may be peculiar to the body being dissected; anything new or newly discovered.

3. To supply only by speech what cannot be shown on your own credit or by authority.

4. Cut up as much as possible before the audience.

5. To enforce correct opinions by bringing together one's own observations and those of others, and illustrating the subject by comparing the structures in other animals, according to the Socratic rule. . . . For the object of anatomy is the knowledge of the parts, their functions, their objects, and their uses. It enables physicians to know the natural condition of the parts, and helps them to discern the changes produced by sickness, and to apply suitable remedies.

6. Not to praise or dispraise others—all did well.

7. Not to waste time by confuting others, except by arguments which can be proved by the dissection.

8. Briefly and plainly, but not letting anything pass which is in view.

9. Not to speak anything which without the carcase may be seen or read at home.

10. Not to enter into too much detail: time does not permit.

11. To take up the three subjects each for its appointed time, viz. (1) the belly, nasty, but recommended by its admirable variety; (2) the parlor (thorax); (3) the divine banquet of the brain.

In carrying out this excellent programme he proceeds in the most methodical and orderly manner, first sketching out a

general plan of the course with endless divisions and subdivisions, so that every part of the subject may have its appointed place. But the anatomical details, admirable as they are—and these I must leave to some future lecturer with more adequate anatomical knowledge to discuss and criticise,—are only a part of the general plan. His larger field comprises applied anatomy, physiology, function, and pathology. After describing any organ in the body before him, its size, situation, shape, number, consistence, and arterial tendons and nervous supply, and dignity or importance, he proceeds to compare the organ thus described with the same organ in the lower animals, in birds, fishes, and insects. He frequently discusses the views held by the earlier anatomists and his own contemporaries, and delivers his own judgments, which are generally initialled W. H. in the manuscript. After finishing with the anatomy he considers the function of the part, how its objects are carried out, and what benefit the economy gains by its presence—what its connections and relations are with other organs in the body, and especially the relation which it bears to the blood and to the spirit, whatever may be the exact meaning of that term.

Harvey himself has no clear conception of what is meant by it. He cannot see it, feel it, handle it, and he appears to me in this, as in all other things, to be struggling to free himself from the confused and confusing teaching of the schools, and to arrive at some definite logical, demonstrable conclusions, when such conclusions were in fact impossible. How could any man, when chemistry was in its infancy, physiological chemistry unknown, and the microscope in the womb of the future, make any logical deductions on points which require all these aids for their elucidation. But he struggles manfully, and will not accept any conclusions which are manifestly at variance with the facts he has observed and can depend on.

Lastly, he adds some shorter descriptions of the organ as he has seen it affected by disease, quotes cases, either his own or his friends', or culled from ancient or modern literature, and describes the symptoms and appearances produced, and sometimes gives brief directions for treatment.

He thus deals first with the abdomen, and quotes the Hippocratic maxim, "Continens Contentum, Impetum faciens,"

which may be roughly translated in modern midwifery jargon as the Passage, the Passenger, and the Powers. After a careful description of the skin, muscles, fasciæ, vessels, etc., of the abdominal wall, in which he illustrates the nervous sensibility of the skin by remarks on mad women who can stick pins in their arms, etc., without apparently feeling pain, he proceeds to describe the organs in rotation, and points out how they may be changed in position by various pressures, pregnancy, tumours, tight lacing—"unde cut their laces." He speaks much of the stomach and its disorders, and mentions his own case as one of vomiting and sneezing when his stomach was out of sorts, while others suffered from vertigo, faintness, and epilepsy.

Harvey is greatly disturbed on the subject of "Coctio," which I take to mean preparation or primary digestion. The subject, he says, is full of difficulties. Some say it is due to fermentation, others that the food is broken down, others that it is melted; none are quite right. His own doctrine is, "Coctio mutatio totius substantiæ cum generatione et corruptione." The teeth are the first agents in the business; some animals, like the barbel and roach, have their teeth in the gullet; others, as the lobster, in the stomach; others, again, have their teeth altogether outside.

Birds, who have no teeth, have strong, rough, thick stomachs to perform the same function. Different animals taste differently according to the food they eat. Camel's flesh is better than horse flesh. The size of the stomach depends on the quantity of food taken. He compares that of a glutton with that of a fasting girl.

The liver is an organ devoted to the preparation of the blood, but is a less worthy (one) than the heart, inasmuch as the former prepares and the latter perfects the blood. Moreover, the heart in the embryo is fully formed even to the auricles, while the liver is still a "cruda indigestaque moles." Indeed the blood itself is rather the maker of the other organs than they of it, for the blood is in existence before any of the viscera—this he reiterates frequently in his essays on generation, where the first manifestation of life and organisation is the punctum saliens.

The spleen also he recognises as a partner in the blood production, but a junior partner—it bears the same relation to

the liver as the wash-house does to the kitchen. All the doctors, he says, declare that the spleen is the receptacle of melancholy, as the gall-bladder is of bile. He was well acquainted with many pathological conditions of the liver, large and small and hard and yellow, and with gall-stones. And, as was natural, when ague was a common disease in the eastern counties, his own country, he had seen many very large spleens —some in members of his own family.

The lectures on the kidneys are perhaps the best in the whole series, as they are the fullest and the best arranged, and are a very good example of his method. The anatomical description is excellent, and is reinforced by even more than his usual excursions into comparative anatomy; and he noticed cases in which there was only one kidney, and other cases in which there were three or even four (this on the authority of Eustathius). His philosophical mind, ever wanting to know the "why" and the "how" of things, was much exercised as to the question, "How is the urine expelled?" Very various opinions were held, but the question was not confined to the excretion of urine, but of all excrements, and of all motions of the body; and the urine is in the same case with the semen, the bile, and the fæces. They are partly attracted, partly expelled, partly seek exit of their own motion or fall in the direction of the outlet. In one word, these processes are all brought about by "Calidum Nativum." "As in the Universe, so in the Microcosm (man), things all move of their own motion to their appointed place." He has seen stones impacted in the ureters and noted the results. Platerus had seen a case where the ureter ruptured and the urine was effused into the abdominal cavity; and Dr Argent had seen one eat out its way through the flank, without producing putridity of the urine or fever.

Stones are sometimes seen embedded in the mucous membrane of the bladder and cannot be extracted. The bladder, he says, does not heal after cutting except at the neck, "as we see constantly when cutting for stone." Has seen and cured cases of prolapse of the bladder with the uterus.

Organs of generation.—He talks of the generative function as a "string tried to eternity." For though Nature cannot secure eternity in the individual, she can arrange a kind of

eternity by the use of these organs which generate like from like for ever—" Unde Sacris Litteris, greatest blessing is issue —that thy seed shall remain for ever." If these parts, these little strings, were wanting in all men, or if they were gelded— " actum est de humano genere "—and he anticipates Tennyson in the remark, made nearly in the same words, that Nature is " so careful of the Type, so careless of the single Life." He deals at great length with these organs in the male (he refers to his writings on Anatomia Pregnantis for the female organs), and with the whole subject of generation, in which he was profoundly interested. Urinary fistula, syphilis, and gonorrhœa were evidently common in his practice.

Having finished with the abdomen and its contents and adjuncts, Harvey next dissects and comments on the second part of the course, viz. the thorax. It is compared in shape and size with that of many other animals—" Figura in homine more flatter quam ceteris animalibus." Its main uses are to protect the internal parts and to act as a fulcrum for the muscles and scapulæ. The narrow, elongated, contracted thorax of the phthisical is well known to him. Respiration is divided into three varieties :—Libera, due to the diaphragm and subsidentia ; violenta to the intercostal muscles ; violentissima to the muscles attached to the scapula and abdomen. The hysterical, the pregnant, and the replete, " all use this panting, fighting fashion of breathing "—" histericis cut laces." Has seen blood, pus, and water in the pleural cavities. The mouth, gullet, nares, and trachea receive due notice, and one or two allusions are made to the way in which tobacco is drawn into the mouth and expelled through the nose.

In speaking of the uses of the diaphragm, he says that opinions differ, but he thinks that, as in all muscles, its function is to contract itself along the direction of the fibres, and that when in contraction it becomes flattened. Others dispute this. The diaphragm in man is like an apron supporting—" cor et pulmones "—in the erect posture. Among its disorders are violent contractions which sometimes cause infants to suffocate. It is also the seat of sobbing, sighing, and laughter.

The lecture on the heart is short (only nine pages), but is full of interest, because it contains in a concise form a description of his discovery of the circulation, though not his fully

reasoned demonstration. He says the word Cor is derived "a currendo quia semper movetur: principissima omnium pars, fons totius caloris,"—the citadel and sacred fane of the edifice. In shape it is turbinated like a fir cone—different shapes in different animals. It has two apices in the embryo. Has heard that some men, though wounded in the heart, had fought on and killed their adversary—"Exempto corde, frog skipp, eel crawl, dogg ambulat." "Ultimum pulsans dextra auricula,"—"Nescio de quo nervo obstructo mors subitat." I know not which particular sinew is affected when a man dies. The heart moves when it contracts as all muscles do.

After describing the heart and its auricles, valves, ventricles, and blood-vessels, he says: "From this it is clear that the action of the heart in its movements is that the blood passes from the vena cava into the lungs through the pulmonary artery (vena arteriosa), and from the lungs into the aorta through the pulmonary vein (arteria venosa). When the heart is relaxed the blood passes into the right ventricle from the vena cava, and into the left ventricle from the pulmonary vein. When the heart contracts it drives the blood by force, as it were, from the right side into the lungs, from the left side into the aorta, whence arises the pulse in the arteries. Relaxed, it receives blood; contracted, it propels it over the whole body, "as my breath in a glove."

In finally leaving the subject he makes the following statement:—"W. H. has proved by the structure of the heart that the blood passes in a continuous stream through the lungs into the aorta. . . . He has proved by means of ligatures the passage of the blood from the arteries to the veins; and from these proofs deduces that the blood is made to travel in a perpetual circle by the pulsations of the heart." It is a question whether this is done for the sake of nutrition, or rather for the sake of the preservation of the blood and of the members by means of this warm infusion, and the blood, after carrying heat to the chilled members, is in turn warmed up again by the heart.

Now, these lectures are dated 1616, and it is generally assumed that Harvey had, even at that date, already worked out his views on the circulation which were first printed in his

well-known work, "De Motu Cordis, etc.," in 1628. But I venture to think that this is not the case. We know that every lecturer worth his salt continues to add to and improve his lectures as time goes on, and as his knowledge broadens out and his experience enlarges. This cannot fail to have been so in the case of a man like Harvey. It seems to me more than probable that these lectures, which were written on about 100 separate sheets, must have been altered and improved continually. Indeed, they have everywhere the marks of much addition, alteration, interlineation, and change. Moreover, the two leaves on which the summary I have just read are written are remarkably clean, have few, if any, alterations, and are written in a more connected and consecutive style than most of the others. I would throw out the suggestion that they were inserted subsequently to the general body of the notes—replacing earlier sheets.

In the four lectures on the lungs, he deals mainly with the physiology of the act of respiration, and with the relation which the blood and the air bear to one another. The size and quantity of the lungs is in direct ratio with the amount of blood and the warmth of the heart, and the signs of quantity of lung power are breadth of chest and amplitude of nares. When the heart and lungs are hot, the nares distend and the pinnæ move, as in runners, horses, angry folk. The colder animals, frogs, serpents, etc., breathe the more slowly and infrequently, hence some can subsist under water for a length of time. Two are necessary in case of injury or disease of one. Has seen one side serve for a long time, indeed a little piece of one side. They are not sensitive to pain, and yet when asthma changes to peripneumonia there is severe pain.

No part of the whole body is so richly endowed with blood. In wasting diseases (tabetic), they become dried, retracted, fungous. Aristotle says that "Old age is the tabes of nature, and tabes is the old age of disease." Among the pathological consequences of disease he has noted vomicæ great and small, "like Hogg's measles," abscesses, calcified masses, "like chalkstones," pus and water in the pleura, but cannot decide how it gets there, but probably through foramina in the pleura which are closed when the lung is distended.

The function of the lungs is to further prepare (concoquere) the blood, so as to make it spirituous and arterial.

There is much debate as to whether the lungs move the chest or are themselves moved from without, either by the heart, the chest, or the muscles, and whether this motion is *animalis* or *naturalis*. He finally, with some hesitation, agrees with Aristotle that, *naturaliter*, the lungs move the chest, and not *vice versâ*, because some animals can breathe freely who have neither muscles which can move the chest (as in birds, who yet sing and trill), nor, as in frogs, who have no chest at all. The lung, therefore, has a power of movement of its own, but this is assisted by the chest and diaphragm. The movement, he decides, is a "natural" one, like that of the heart and the uterus. It is carried on when one is not thinking of it—during sleep and other forms of unconsciousness. The lungs may collapse or become torpid, as in chincough, in breathing foul airs, in cases of children who go black and suffocate although the "animal" faculty still subsists. There are also, of course, voluntary movements of the lungs.

Another difficult problem is what happens to the air when it gets to the lungs—whether it warms or cools the blood, and what part it plays in the "concoction" of the blood and vital spirits. For if the blood is "concocted" in the lungs, how is it that it does not pass through them in the embryo? The lungs certainly, when the motion of respiration comes to an end, drive the blood from the pulmonary artery into the pulmonary vein, and so into the left auricle.

The remaining subject dealt with in these lectures is the skull and its contents, and it is treated in the same general way, though at greater length than some of the others, viz. ten lectures.

The head is round, because this is the perfect figure, and Nature does everything in perfection. All things are round, except for some good reason, *e.g.* the cœlum is round, so are trees, etc.; round-headed animals have most capacity and the biggest brains; different shapes go with different types of character; a man with a small, well-shaped head is timid, shy, irascible; well-shaped heads of moderate size are clever, acute, and wise; big heads are fatuous and dull.

The anatomy of the brain and nerves is given at length,

and it is strange, when reading the anatomical description, to find how conservative modern anatomists are in retaining the old names—our much-loved friends, hippocampus, calamus scriptorius, testes nates, septum lucidum, and a dozen other familiar and fantastic terms. The dura mater is in two parts, like plura and peritoneum. The pia surrounds and supports the brain as the mesentery does the intestines, but follows into the intestines, where the dura cannot penetrate. The sinuses contain blood, whether arterial or venous is doubtful; they are just sinuses, and are peculiar to the brain. Some say that the pulsations of the brain are due to air and spirit. W. H. thinks the pulsation is due to the proximity of pulsating arteries. The cerebrum swells with coughing and speaking. He has seen malignant tumours as large as an egg in the substance of the brain, and describes very graphically the case of Dr Argent's little daughter, which is clearly one of tubercular meningitis.

The physiology of the brain is dealt with at large, but with some diffidence. It is in man the most important organ, and enables him to rule all other animals. Discussion whether the substance or the ventricles are the seat of mind. Probably the former, because some animals have no ventricles, and yet are highly sensitive. Memory may be located in the cerebellum, because it is of firmer consistence and likely to be more retentive. The nerves merely carry motion and sensation, do not cause them. It is remarkable that when one side of the cerebrum is injured the effects are seen on the opposite side of the body.

In temperature the brain is cool, because it contains little blood and is soft and moist. We still retain this idea in cool-headed, hot-headed, etc. He compares it to a cucumber, which receives, collects, attracts, condenses, and retains moisture.

The ever-present subject of the spirit is again in evidence. Bauhin lays down seven laws about it, all of which are doubtful, most of them impossible. As before decided, the blood is the spirit.

Another series of these lectures still exists in MS. It is devoted to the muscles, and consists of 121 leaves, with writing on both sides, and is in the Sloane collection in the

British Museum. They are very similar in style to those just noted, and Sir G. Paget, who has analysed them and published a description of the manuscript, has noted many quaint analogies of the various organs. Thus the brain is compared to a military commander, the leader of an orchestra, and an architect, the nerves and muscles being their respective subordinate officers; or the brain may be looked upon as a king, the nerves are his ministers, the nerve branches his minor officials, and the muscles the people (*cives, populus*). Again, the brain is the captain of the ship, the spine his mate, the nerves are the boatswain, and the muscles the sailors; or, rather, the heart should be king or emperor, the brain the judge or sergeant-major. I have not been able to see these lectures.

In summing up these lectures, we see that they form an epitome of the anatomical knowledge of the day, with clearly-reasoned and well-balanced inquiries into the uses of the various organs and parts, and the causes of their motions and functions. We see how Harvey was hampered by the doctrines and traditions of the schoolmen, and by the backward state of scientific knowledge; and we see how, though bowing to authority, specially that of Aristotle, in things which were purely speculative and inductive, he allows no man's authority or judgment to interfere when face to face with his observed facts. "Nullus addictus jurare in verba magistri," he gives all a hearing, criticises, accepts, or rejects their views with impartiality, according as they present themselves to the judgment of his remorseless logic.

The consideration of these lectures has taken up so much time that I shall have little to say of his other writings and of his very eventful life. He was made Physician-Extraordinary to James I. in 1618, and besides attending upon the Royal Household he had under his care many of the leading men of the day—Lord Bacon, Thomas Howard, Earl of Arundel, Sir William Sandys, and many another.

In 1628, at the zenith of his career, he gave to the world, at Frankfort-on-the-Main, his immortal essay on the circulation of the blood, infinitely the best known of all his writings. To those who have never read it—and I fear that there may be some even among the members of this Harveian Society who

have omitted to do so—I would recommend its early and earnest perusal, not only on account of its historical value, but for its extraordinary and enthralling interest. Indeed, it is a perfect model of what such a paper should be. After reviewing, with competent knowledge, the opinions and views of his predecessors and contemporaries, he proceeds to show, as the result of endless experiments and observations on the living heart of various animals of all sizes, that the blood *must* pass from the veins through the right heart and lungs to the left heart and arteries. The idea of the circulation, the constant stream of blood moving round perpetually in the same direction, seems to have burst upon him while he was revolving in his mind the quantity of blood which passed out of the heart into the aorta with each pulsation. This is the keynote of the whole composition: the heart is the motive power of the whole circulatory system. As d'Arcy Power remarks: "It is here laid down with a precision of detail, with a logical exactness, and with a wealth of illustration which is marvellous even to us who read of the circulation as an established and fundamental principle upon which the whole body of physic rests" (191), p. 208. Boundless industry, exact observation, the most logical and convincing reasoning, all bear their part in making this remarkable essay an example for all time. There had been many workers on the relations of the blood to the heart, arteries, veins, and lungs, and some glimpses had been had of a doctrine of circulation, principally with relation to the lungs; but before Harvey, no one had grasped the whole subject and conquered it. As Willis says (lxvi. 4): "On the doctrine of the circulation the dawn had long been visible; Harvey came and the sun rose."

The publication of this essay is said to have greatly reduced the extent of his practice, as many of the weaker brethren looked upon him as a fantastic idealist, and would have none of his doctrines. In fact, at first they met with little acceptance, but as time went on his pupils and the rising generation of doctors, both at home and abroad, realised their transcendent importance, and revered Harvey as the foremost man of science of his day. Before his death its truth was recognised to the fullest extent. Whatever his position among the general practitioners, he was always held in honour by the Royal College

of Physicians, and held office as Censor Elect or Examiner, Treasurer, Librarian more than once. He was offered the Presidentship late in life, but declined it.

Much of his time was now spent at the Court and with the King, Charles I., who appointed him Physician-in-Ordinary about 1630. His relations with Charles were always most cordial, and reflected honour on both. After making a tour in France and Spain with the Duke of Lennox in 1630, he went with the King to Scotland in 1633. While there he paid a visit to the Bass Rock, and has left a most graphic account of the myriads of birds he saw there, in all stages of growth, and of the cliffs whitened with their droppings.

In 1636 he accompanied the Earl of Arundel to Vienna, and visited Rome. At Nuremberg he demonstrated the circulation to the venerable Hoffmann, but failed to convince him of its truth.

With the outbreak of the Civil War he attended the King to Newcastle and York, and later on was present, in charge of the two young princes, at the battle of Edgehill, 1642. Here he saw and treated some interesting cases of gunshot wounds. The following year he was dismissed from St Bartholomew's, probably at the instance of the Parliament. He remained with the Court at Oxford, and, as a reward for faithful service, was made Warden of Merton in 1645. Here he assiduously continued his researches on generation and development. But he only held this appointment for a few months. After the fall of Oxford, in 1646, he withdrew from further attendance on the King. The reason for this we do not know; but his age, 68, and his frequent attacks of gout, made him more fit for a life of retirement and rest than for facing the "moving accidents of flood and field." Not that he rested on his oars and did nothing. He still continued to work hard at his favourite subjects, especially at development. His essay on this subject was not published until ten years later, when, very reluctantly, he handed it over to his friend Dr Ent, who prepared it for the press, and furnished it with a high-flown dedication to the President and Fellows of the R.C.P. This is the most voluminous of his writings, and, no doubt, occupied much of his leisure time for many years. I regret that I have no time now to deal with it. The main thesis is "omne ovum ex ovo," and

he takes the egg of the fowl as the type of all other oviparous animals, and follows the gradual development of the embryo from the first day after it is laid until it has escaped from the egg and begun a separate existence; and as the type of viviparous animals he illustrates from the doe—these being the largest animals which he could easily obtain. He defines an egg thus: (462) "An egg is a conception beyond the body of the parent: a conception is an egg remaining in the body of the parent." In one remark he comes very near the doctrines of natural selection and survival of the fittest. "The common cock," he says, "is distinguished by his spurs and ornamented by his comb and beautiful feathers, by which he charms his mates to the rites of Venus, and is furnished for the combat with other males: the subject of dispute being no empty or vainglorious matter, but the perpetuation of the stock in this line or that: as if Nature had intended that he who could best defend himself and his should be preferred to others for the continuance of the kind."

Of his other writings, mostly letters, I need not speak.

Harvey's last years were spent in retirement. He lived with his brother Eliab, either in London or in the country, and spent his time in studying mathematics and in contemplation. He suffered much from gout, and had an original method of treating it. "He would sit with his legs bare," says Aubrey, "on the leads of Cockaine House, put them into a pail of water until he was almost dead with cold, and then betake himself to his stove, and so 'twas gone."

He died of apoplexy, commencing as aphasia, at Roehampton, on June 3, 1657, in the 80th year of his age. His body was brought to London, and eventually buried in a family vault at Hempstead, in Essex.

And so passed away this great man, full of years and honours, who deserved well of his country and of mankind. He had lived a strenuous, active life, serving well his King and his fellows amidst the storm and stress of one of the most stirring and painful epochs of British history. And yet he found time, among all his thronging duties, to patiently watch, and investigate, and observe, in their minutest details, the structure and functions of a great series of animals, from the lowest insects up to man himself. He found time, too, for

continuous thought; and bringing to bear on his observations a mind exceptionally acute and logical, and stored with all the learning of his day, he succeeded in deducing a great and glorious scientific truth, which he laid as a sure foundation for the splendid structure of modern medicine.

ON THE OCCURRENCE RECENTLY IN EDINBURGH AND NEIGHBOURHOOD OF UNUSUAL FORMS OF CEREBRO-SPINAL FEVER AND INTOXICATION, RESEMBLING EPIDEMIC CEREBRO-SPINAL MENINGITIS

By ALEX. JAMES, M.D., Edinburgh

WITHIN the past fifteen years I have seen, from time to time, as I daresay a good many others have, serious and often fatal cases of cerebro-spinal intoxication and fever, in which the ordinary causes of such symptoms could be apparently excluded, and for the explanation of which, therefore, some less ordinary infective or toxic agency had to be thought of.

Within the past few months it has been my experience to see, in the Infirmary and elsewhere, of such cases a much larger proportion than usual.

My object in bringing this subject before you at present is to discuss: first, if a similar prevalence of this class of case has presented itself in the experience of others; and secondly, if any precise conclusions as regards its nature can be arrived at. In what I have to say I shall concern myself specially with the clinical aspects; and I shall not detail to you all the cases I have seen, but confine myself to sketching out a number of the more marked and outstanding ones. Most of them, as I have already stated, have occurred within the past few months, and to these I shall devote most attention. Inasmuch, however, as the clinical picture which I wish to portray might lose somewhat if some of the older ones were not included, I shall in the first place sketch out some of them.

One day in May 1890 a number of boys belonging to the Edinburgh Industrial Brigade Home were having a holiday in

the country. Whilst they were all at play, one of them, a healthy-looking boy of 13, was discovered lying on the ground at the foot of a tree in a state of unconsciousness from which he could not be roused. He was conveyed home, and in the late afternoon I saw him. He was rather pale, and his pupils were dilated; pulse 80 per minute and rather feeble; his temperature was normal. There were no indications of hemiplegia or other forms of paralysis, and he was completely unconscious.

From his companions, all I could ascertain was that he had complained of some headache in the early part of the day, and that it was most unlikely that he had fallen from the tree or had sustained any hurt. About 11 P.M. twitchings of the muscles of the face with some retraction of the head were noticed, and these continued at intervals till 1 A.M., when he died.

As causes, injury, hæmorrhage, cerebral tumour or abscess, sunstroke, poisoning, were all thought of, but at the sectio, with the possible exception of some hyperæmia of the grey matter of the pons and medulla, all the organs were found quite healthy.

Of similar cases I could report several others, but I shall now pass on to cases occurring in 1903.

Agnes B., aged 13, was sent to me by Dr Melville of Penicuik, on the 5th March 1903. She was a particularly well-nourished and healthy-looking girl, and her only complaint was absolute nervous deafness. Her mother gave the following history:—

Her illness had commenced in the second week of the previous December, and the main symptoms were fever and headache. The headache seems to have been specially severe in the back part of the head and neck, and there was great tenderness, the child crying out whenever attempts were made to move her in bed. There was no retraction of the neck, but some stiffness of the muscles. Vomiting was also a prominent symptom, and was stated to have been incessant for two days and two nights. After a few days the child seems to have become comatose, and to have remained so for some days. After about ten days recovery occurred, and it was then noticed that her hearing was impaired, the child

asking why everyone was whispering. In a few days the child became completely deaf. About six weeks after the commencement of her illness, the child was allowed out of bed, and giddiness and incapacity to stand or walk were noticed. These last symptoms, however, have now disappeared, and, except for the nerve deafness, the child is absolutely well.

James C., aged 7 years, was sent to me by Dr Dow, of Crail, on 7th March 1903. His complaint was complete blindness, of nine days' duration. His history was as follows:—

He had been a perfectly healthy boy in every respect until nine days previously. He had then become suddenly very ill, with high fever (104°), severe headache, sickness, and vomiting. Those acute symptoms lasted for three days, and then it was noticed that the right pupil was widely dilated, and that he was blind of the right eye. In the course of a day or two a similar condition was observed in the left eye. The acute symptoms having passed off, but the blindness persisting, Dr Dow sent him to me to the Royal Infirmary. On admission he was found to be a perfectly healthy, well-developed, and well-nourished boy. He was blind, and had to be led about. His pulse was 72 per minute, temp. 98.8°, coming down next day to normal, and remaining so. For a day or two, however, after admission, he complained of occasional rather severe frontal headaches.

On examination, all his organs and systems were found to be healthy, except his nervous, and of that only the eyes were affected; sensory, motor, and reflex phenomena, and the special senses—hearing, taste, and smell—being absolutely unimpaired. He was so blind that he could not see objects held in front of him; but he seemed to prefer being in darkness, a bright light tending to irritate his eyes. The pupils were widely dilated, especially the right, and they showed no reaction to light. On testing the movements of the eyes, it was found that conjugate movement to the right was slightly impaired; more so with the right eye. With the ophthalmoscope, no definite changes in the fundi could at this time be recognised. A small quantity of the nasal secretion was examined. The diplococcus intracellularis meningitidis was not found.

March 21.—Patient's general condition remains excellent,

and his headaches are less frequent and severe. Blindness persists, and distinct signs of optic atrophy are present in both eyes.

March 26.—Patient's vision has been improving for the last few days. He does not focus on looking at objects, but he was able to-day to distinguish a knife from a pencil. The signs of optic atrophy are more distinct.

May 17.—Although he has had an occasional headache, patient's general condition remains excellent. His vision has so much improved that he can go about the ward himself, and can count fingers in a good light, eight or ten feet off. The left eye is the better of the two. Both pupils are still distinctly dilated, but both contract slightly with light, the left eye showing this the better. The impaired conjugate movement of both eyes to the right has greatly disappeared. With the ophthalmoscope there is well-marked white atrophy in both eyes. Anent these two cases the explanation which commends itself to me was, as stated at the time, that "be it epidemic cerebro-spinal meningitis or not, the lesion is one of a toxin involving the nuclei of origin of the auditory and optic nerves. Just as in the anterior poliomyelitis of children we have a toxin picking out the nuclei of origin of the nerves of the voluntary muscles, so we may assume that in this disease we have a toxin picking out the nuclei of origin of the nerves of hearing and sight."[1]

John L., aged 18, slater, residing in Edinburgh, was admitted October 29, 1904. From the doctor who had been attending him, the following history was obtained :—

He had become suddenly ill about fourteen days ago with some chest pain, cough, and spit. The fever at the beginning of his illness had been distinctly high, the temperature at certain times reaching 105° F. The physical signs in the lungs had resembled those of a broncho or catarrhal, rather than of a croupous pneumonia, viz.: rhonchi and crepitation all over both sides posteriorly, but specially at the right base, where there had also been some impairment of the percussion note. About the eighth or ninth day of his illness the temperature fell suddenly, but this proved to have been a pseudo-crisis rather than a crisis. Fever, rapid pulse, cough,

[1] *Scottish Medical and Surgical Journal*, 1903.

and spit, had persisted, and some diarrhœa, with pulpy, rather pea-soup looking stools, had occurred. This, with the continued fever, the great emaciation, the dry brown tongue, and the felled appearance of the patient, had suggested the possibility of typhoid fever, and about the eleventh or twelfth day, a "Widal" had been made with negative results. It was then arranged to admit him into the Infirmary.

His doctor informed us also that there seemed to be a family history of tubercle, at any rate that a brother of the patient, aged 8 years, had died of what looked like a rapid tubercular meningitis, just before this patient had taken ill. Also that the patient himself had had a cough and spit for four months before this illness began.

On admission he was found to be very thin and emaciated —temp. 100.4°, pulse 120, resp. 40. His face was flushed, and he was sweating profusely, and had evidently been so for some time, for sudamina were found all over the skin, especially of the trunk, which showed also a marked red miliary and also petechial rash. His tongue was dry, brown, and glazed, and over his teeth and gums sordes were present. Dried secretion crusts showed also about his eyelids, and the eyeballs were glassy-looking. The abdomen was slightly tumid, and on the day following his admission he had three rather typhoid-looking stools. No splenic enlargement was made out, and his blood showed a leucocytosis to 2400.

He did not complain of chest pain, but he had a cough with a slight amount of spit, somewhat viscid, but not at all rust-coloured like a pneumonic spit. Examination of the spit showed a few doubtful tubercle bacilli and many cocci and diplococci, but no typical pneumococci. Examination of the chest revealed rhonchi and crepitations over both lungs, with a slightly impaired percussion note at the right base.

Urine showed no abnormality, and mentally he was very much felled, and could hardly be roused to answer questions. Pupils were equal and slightly dilated, and reacted to light but slowly. Ophthalmoscopic examination revealed nothing.

On the day after admission his morning temperature was 101.6°, pulse 110, resp. 36, and he appeared in much the same condition. In the afternoon he developed distinct nerve symptoms. Attacks resembling the opisthotonus of tetanus

showed themselves. His trunk and limb muscles became rigid, his back arched and his head drawn up, and his chin pointed up. His teeth were clenched. These spasmodic attacks came on at first about every twenty minutes, with intervals of incomplete relaxation. In these intervals he complained of great pain in the head and neck, apparently from the cramp, and also in the epigastrium, probably from diaphragmatic spasm. Kernig's sign was markedly present, the toes were plantar flexed, and the feet arched. On tickling the soles of the feet, the legs were drawn up actively, but the knee-jerks could not be elicited, probably owing to the muscular spasm. Priapism was present.

Towards evening these attacks became more frequent and violent. He became distinctly delirious, and appeared alarmingly ill. Lumbar puncture was performed, and 15 c.c. of cerebro-spinal fluid were removed. This fluid, though not spurting out in a distinct stream, came very readily, indicating of course a high tension. This little operation was followed by marked amelioration in all his symptoms. He had no more opisthotonus attacks; he became mentally clearer, and expressed himself as feeling distinctly relieved. Next day he was much better—temp. 98.6°, pulse 88, resp. 32—and the bowels were moved only once. He continued to progress, and though in the few days following he developed a parotitis —right—this did not suppurate. He slowly but steadily improved, and left the hospital for the Convalescent on December 6, 1904.

The puncture fluid was quite clear, showed a slight lymphocytosis, but no organisms, either by staining or culture.

He is now quite well, and he tells us that although he has been liable to a cough in winter-time he has always been strong. Repeated examination of his spit since his recovery has failed to reveal tubercle bacilli.

Lizzie M., aged 24, a millworker, belonging to Renton, was admitted to the Infirmary on 10th December, complaining of great headache, but in a state of semi-unconsciousness, so that she could give no history of her illness. She was brought in by the police, who stated that that evening she had applied at the shelter for a night's board, but had appeared so ill that ambulance aid had been called in, and she had been sent to

the Infirmary. Subsequent inquiries indicated that she had been a millworker, living with her family in comfortable circumstances, but that owing to some domestic squabble she had left home three weeks previously, and had been wandering about since.

As regards previous illnesses, she had had scarlet fever some years before, but had quite recovered. She also had had for some time exophthalmic goitre in a slight degree. In every other way she had been healthy. After leaving home, three weeks before, she had evidently been in bad company, but she presented no evidence of disease, and on her admission there was no evidence of excessive drinking.

After wandering about she had passed the night before her admission in the shelter. There she thinks she had got cold, and next morning she had a shiver, and was evidently feverish. In spite of this, she had gone about next day, and had actually walked some 15 miles, as she says, looking for a place, having during that time very little food. Towards night she felt very ill, with headache and vomiting, and applied again at the shelter. She seems then to have been only semi-conscious, and cannot remember of her having been brought to the Infirmary.

State on Admission.—She was very flushed and feverish, temp. 101.4°, pulse 124, resp. 24. She appeared a well-developed and well-nourished young woman. She had evidently great pain in her head, and could hardly answer questions. Prominence of both eyes was noticed, with slight ptosis of the left eye. Examination of the digestive, circulatory, respiratory, and integumentary systems revealed nothing. She was, however, perspiring considerably. As she had passed no urine, a catheter was passed, and about 20 oz. of urine drawn off. It was acid, spg. 1012, and contained no abnormal constituents. The blood was examined, and showed nothing abnormal. As regards the nervous system, no Kernig's sign was noted. The knee-jerks were present, but slight, the pupils were equal, reacting to light but slowly. Ophthalmoscopic examination revealed nothing.

On the night following her admission she slept very little, moaning a great deal, and sometimes crying out, seemingly with the pain in the head. She had no vomiting, but seemed

to have great thirst, drinking whenever water was given to her. Next day she seemed in very much the same state, but rather worse—temp. 102.4°, pulse 128. She could hardly be roused, complaining only of the pain in the head.

In the evening, as the patient seemed to be getting worse, lumbar puncture was practised and 22 c.c. were drawn off. The fluid spurted out, indicating great increase in the tension. Immediately after the operation, the patient declared herself very much better, and she shortly went to sleep, sleeping quietly for several hours. Next morning she declared her headache all gone; her temperature had fallen to 99°, her pulse to 112. On the following day she declared herself quite well, and she has now, except for the slight exophthalmic goitre, quite recovered.

Examination of the cerebro-spinal fluid showed no excess of cells, and no organisms, either by staining or culture.

On Thursday, December 15 last, I was asked to see a girl, M. M., aged 16, a milliner, who was apparently suffering from some form of meningitis.

Though a little anæmic, she had previously been healthy and fit for work.

The history was that on the previous Sunday (December 11) she had been well and out as usual.

On the Monday morning she had been feeling a little out of sorts, with headache, yet had gone to her work. She had come home earlier than usual, complaining of headache and feeling ill, and had gone to bed.

Next morning she did not rise as usual, and her mother, thinking she would be all the better of the rest and sleep, did not disturb her. In the course of the day, however, it was noticed that she was very dull and somnolent, and when roused complained of her head. She seems also to have vomited. The doctor was called in, who thought it was some form of influenza, and prescribed phenacetin, which seemed to ease the headache.

Next day, 14th, she was worse—more somnolent, temperature slightly raised, pulse about 90.

On the 15th I saw her, and found her unconscious and incapable of being roused. Her pulse was 90 and variable, her temperature was about 100°. Her pupils were equal and

reacted slightly to light; some squinting had, however, been noticed.

Kernig's sign was present, the plantar and knee-jerks were normal, and no paralysis could be detected.

Lumbar puncture was proposed, but before it could be carried out the patient died, the duration of the illness being about four days.

No sectio was obtainable.

A. A., aged 8, a schoolboy, was reported to have been in his ordinary good health till 17th April 1905. On that day he was out with his companions in the street, watching a performing monkey, when he suddenly fell to the ground, a little distance from his own home. His companions helped him home, and noted that he seemed to drag his left leg and that he was crying out from pain in his head. On arriving home and being put to bed, he became dazed and partly unconscious. When roused, he complained of pain in the head, specially on the right side. On Dr Thin's arrival he found him lying quiet in bed on his left side in a crouching position, with his arms flexed and legs drawn up; his pulse was 88, temperature 98°. He was unconscious, and did not answer questions, and it was noticed that the left side of the face, the left arm and left leg, seemed paretic. His pupils were dilated, and reacted only slightly to light. He was ordered 2 drachms of magnesium sulphate. In the evening his pulse was 80, respiration 22, temperature 97.6°. It was noted that he had been moving his left arm and leg slightly. He had vomited once or twice, and fæces and urine had been passed in bed. Examination of the urine had shown a very slight trace of albumen.

Next day, April 18, he seemed slightly better, being more easily roused. He had vomited several times, but as the day wore on he had called once or twice for the *pot de chambre*. He still complained much of headache. Sensation, considering his dazed condition, seemed fairly normal, and the paresis of the left face, arm, and leg seemed less marked. The pupils were dilated, and there appeared an impairment in the conjugate movement of the eyes to the left. The plantar reflexes were more marked in the left leg; the knee-jerks were absent in both.

On April 19 it was noted that his general condition was much the same. There was no fever, but he had had a restless night, crying out at times. He was very dazed, but yet very irritable as regards light and sound. No vomiting and no movement of the bowels.

April 20.—During the night he was at times restless and cried out. During the day was drowsy, but could be roused to answer a question. Pulse 80, temperature 100°. Occasional flushings of the skin all over were noticed, but no perspiration. Some slight retraction of the head was noticed.

April 21.— Lumbar puncture was performed, and about 9 c.c. fluid withdrawn. It came away evidently under considerable pressure, but was quite clear. Patient slept for some hours after this.

April 22.—Patient appeared better; he had no headache, but was obstreperous and difficult to restrain, complaining of slight pain in the back, but seeming to move his eyes and limbs better than before.

April 23.—Slept well all night, but very cross to-day; no headache, and is distinctly better in every way.

From this date he gradually progressed, and is now well, although distinctly pale and thin. The cerebro-spinal fluid was examined by Dr Shennan, and he reported that it contained—

Staphylococcus albus and another staphylococcus—aureus or citreus.

Two bacilli, one like pseudo-diphtheria class, another short with rounded ends.

No diplococci.

In connection with these cases I have said little as regards the organismal or toxic agency probably concerned. Naturally one thinks of the organisms of epidemic cerebral meningitis, of simple basic meningitis of children, or of influenza. Inasmuch, however, as the organisms to which those diseases are ascribed seem, like many other organisms, by their frequent presence in healthy conditions, to vary from extreme virulence to absolute harmlessness in different individuals, and in the same individuals in different times, it is most important to endeavour to interpret in every way the conditions upon which this variability depends. Towards this object, clinical records

of cases presenting distinctly unusual symptoms, and following distinctly unusual courses, must conduce, especially when they have occurred and can be appropriately considered in groups. It might therefore serve a purpose to note along with those unusual examples of the more acute forms of cerebro-spinal intoxication which I have seen lately, a number of no less unusual but more chronic forms.

It is evident, however, that such a group would include lesions of every part of the cerebro-spinal axis, from the cerebral cortex cells above, to the peripheral nerves below, and it is equally evident that this would involve the detailed description of a list of cases in which as symptoms, not only disturbances of consciousness, speech, sensation, and motion were present, but cases also which resembled those of encephalitis, transverse, and poliomyelitis, diffuse sclerosis, general paralysis, etc. This would lead me beyond the subject of my paper, so I shall confine myself just now to the detailed description of one case only. I wish, however, here to take the opportunity of stating that within the past two years I have seen examples of all of those diseases just named, which have, as regards etiology, symptoms, and course, been most unusual.

The case of cerebro-spinal intoxication which I wish now to describe in detail is the following :—

Mrs S., aged 48, residing in Leith, was admitted to Ward 33 on March 20, 1905, in a state of great restlessness and delirium, and with a history of having been ill for over two weeks.

Her previous health had been excellent ; she had been an active and hard-working wife and mother, always rather anxious about her household duties, and complaining only of occasional headaches. About three years previously she had had Bell's paralysis for a few weeks, probably as result of cold.

Her family history was good. She has had ten children, all except one being alive and strong.

Her present illness began about the beginning of March. She complained of feeling tired and of headache. It was noticed after a day or two that though she was still going about, she was not speaking in her usual way—she seemed to have difficulty in finding words. She was also not walking so

well, and was forgetting things. This was noticed one evening, and next morning, when Dr Paterson saw her, he found some paresis of the right face and arm, and to a slight extent also of the right leg. She complained also of numbness of the right arm. From this time she was kept in bed.

On March 9 she complained of very severe headache, specially of the right side, and then vomiting came on. At this time, also, she was difficult to rouse, and appeared dazed. All through this period the temperature had remained normal, and the pulse beating quickly, about 76 per minute. In this dazed condition, urine and fæces being passed involuntarily, she continued. When roused to speak at times she complained only of the headache.

On March 15, convulsive attacks showed themselves, the arms and legs shook, the face was twisted, and the head drawn back. These began at 2 P.M., and continued every few minutes till 6 P.M., after which time she lay quiet, but absolutely unconscious.

On March 19, lumbar puncture was performed and 9 c.c. fluid withdrawn. The fluid came away drop by drop quite freely, but showing no great tension, and on examination by film and culture it showed nothing abnormal. After this the patient became extremely restless and delirious, trying to get out of bed. She was next day (March 20) sent to the Infirmary. On admission she was exceedingly violent, requiring to be held down in bed. Temp. 100.8°, pulse 108; her face was flushed, and she looked dazed, and paid no attention when spoken to. Sensation seemed to be, considering her dazed condition, unimpaired. No paresis nor paralysis was discoverable, but her right hand and arm were kept continually moving, picking at the bedclothes. Her reflexes, superficial and deep, were very slightly marked, Kernig's sign was slightly present, fæces and urine were passed in bed.

There was no strabismus, the pupils were rather small and reacted slowly to light.

Examination of the heart, lungs, and other organs showed nothing of note. The urine showed no abnormal constituents, and there was no leucocytosis. In this condition she remained all day, and in the evening chloral and bromide of potass were

given. This quieted her a little, but she never slept, and kept continually moving her right arm, picking at the bedclothes. Next day her condition was practically the same. Lumbar puncture was performed, and 17 c.c. were withdrawn. It was noted that the flow showed slightly increased tension, but the fluid had a normal appearance, and showed neither leucocytes nor organisms. This puncture seemed to do her some good. She was much quieter, and by night she was able to tell her name, and to push out her tongue when asked to do so. It was noted, however, that she took a long time to do this, and that she still looked dazed, and kept moving her right arm and hand. That evening she slept a good deal.

On March 22 she was distinctly better. She answered when spoken to, but after a long time. She complained of pain in her head. She also asked for the bed-pan for the first time. On this day too a more careful ophthalmoscopic examination of the eyes was made, and revealed as before nothing abnormal. From this date she seemed steadily to improve, but still complaining of headache, mostly on the right side. She began to take some interest in what was going on in the ward, and was able to state that she remembered absolutely nothing of her illness.

The next entry is April 7, 1905.

The patient has been apparently well. Pulse and temperature normal. She has been quite sensible, and has been up and moving about in the ward. For the last day or two, however, she has been complaining of a return of her headache, and as yesterday the headache was still more marked, she had the static douche for a few minutes. She expressed herself as feeling better after it, but to-day on getting up she felt it so bad that she had to go back to bed. In the afternoon she vomited, and soon after relapsed into a soporific condition. She did not seem to hear anything said to her, and if she did reply it was done very slowly.

April 8.—Patient in same condition; cannot feed herself and passing urine and fæces unconsciously. Pulse 84, temp. 97° to 98° F.

April 9.—Patient appears worse; very somnolent; pupils rather contracted; vomited in the afternoon. With her somnolence a somewhat increased muscle and nerve irritability

was noticed, *i.e.* on stimulating the skin the limbs were jerked more vigorously than before. Pulse 76, temp. 96.4° to 97.4°. Lumbar puncture again performed, and 2 c.c. withdrawn; no tension. Film showed a normal field.

April 10.—Patient much as yesterday, but some twitching of muscles of arms noted. Pulse 76, temp. 96° to 97°.

April 11.—Patient much as before, but marked twitching and movements of arms, especially of the right. Said "Good-morning" once when spoken to, then relapsed into the usual somnolent state. Pulse 100, temp. 97.6° to 98.6°.

April 12 and 13.—General condition unchanged. Flushing of face from time to time noted. Pulse 68 to 80, temp. 97° to 98.4°.

April 14.—Patient much as before, but twitching of arms less, and on several occasions seemed to understand what was said to her, and spoke a few words. Her relatives believed that she recognised them. Pulse 64, temp. 97° to 98°.

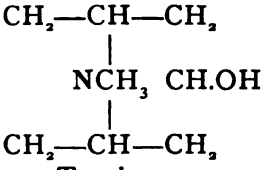
April 15.—At 8 A.M. appeared better. At 9 A.M. she suddenly became cyanotic, and violent twitchings of the arm occurred. These showed themselves at intervals, and at 3 P.M. a specially violent attack came on, involving the right arm and leg chiefly. Chloroform was administered to allay this. Pulse became rapid and feeble, temp. rose to 102.2°. Profuse sweating occurred, and the bronchi became filled with secretion. With the chloroform the twitching stopped, but she remained cyanosed, and Cheyne-Stokes breathing occurred, the pauses lasting for 20 seconds. In the course of the evening the pulse became absolutely imperceptible, and she died at 11 P.M.

On post-mortem examination, beyond very intense hyperæmia of the grey matter at parts, in the pons, medulla, and cord, nothing distinctive was found. Microscopic examination showed also no distinctive changes in the nerve tissue.

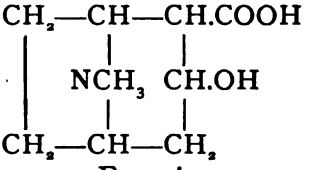
STOVAINE—A SYNTHETIC ANALGESIC

By THOMAS D. LUKE, M.B., F.R.C.S.,
Lecturer on Anæsthetics, University of Edinburgh

A MORE complete knowledge of the constitution of atropine and cocaine has led, of late years, to the production of a series of local anæsthetics which start from a compound, the relation of which to the natural alkaloids was not at first suspected. Atropine and cocaine are closely allied both as regards their action on the pupil and sensory nerve endings. Both are active mydriatics and local anæsthetics, although the analgesic power of atropine is comparatively slight. Their resemblances are immediately related to the similarity of the groundwork of their structure. Atropine is derived from tropine and cocaine from ecgonine, which only differs from the former in that it contains the COOH group.

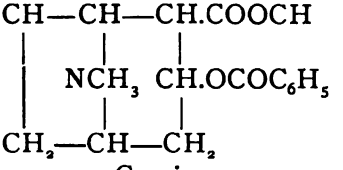


Tropine.



Ecgonine.

Neither tropine nor ecgonine possess any local anæsthetic power nor are they mydriatics. Cocaine is simply ecgonine with the hydrogen of the hydroxyl group replaced by an acid radicle—benzoic acid—while the hydrogen of the carboxyl group is replaced by an alkyl radicle methyl.

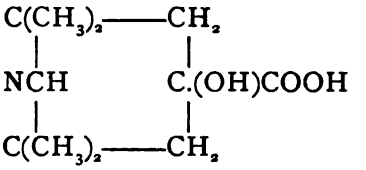


Cocaine.

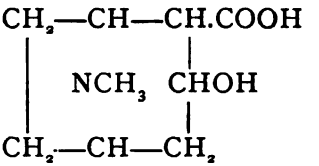
If either the acid radicle or the alkyl radicle be removed from this drug all local anæsthetic action is lost.

In view of the fact that ecgonine, the parent substance of cocaine, is merely tropine plus a carboxyl group, Merling predicted that if such a group were inserted into triaceton-

alkylamine (a substance derived from acetone by the action of ammonia, and subsequent reduction), a compound would result which might serve as a nucleus for the preparation of artificial local anæsthetics, and he subsequently verified this prediction by preparing a carboxyl acid of the following structure :—



This was very like



Ecgonine.

though not strictly homologous with it.

On replacing the hydroxylic hydrogen, however, with benzoyl, and the carboxyl hydrogen with methyl (as we treat ecgonine to obtain cocaine), he obtained an excellent analgesic, which is widely known at the present day under the name "Eucaine." While Eucaine β is likewise obtained by introducing a benzoyl radicle into methyl vinyl—diacetoalkylamine (a substance very similar to ecgonine, and differing from it only in the absence of one of the lateral methyl groups).

If the acid radicle in cocaine be eliminated, the substance which we obtain is benzoyltropine, which is in no way an analgesic, but benzoyl-pseudotropine, or tropo-cocaine—a stereo-chemical isomer of benzoyltropine—is analgesic to a marked degree.

Eucaine β, in not possessing the carboxyl group, is very similar to tropo-cocaine in constitution, while eucaine contains the three radicles of cocaine-acid, hydroxyl and amino tertiary, and so resembles it as closely as possible.

In spite of their possessing marked analgesic power, however, these bodies, the eucaines and tropo-cocaine, have scarcely fulfilled the expectations of the German chemists who are

responsible for their introduction. The reason is that, in spite of the assertions of Gaetano Vinci and Liebrick, α and β eucaine are just as toxic as cocaine, if not more so, as has been shown by Pouchet. Moreover, M. Reclus has stated, in his well-known work on Local Anæsthesia,[1] that the analgesia obtained by means of these drugs is slower in onset, and more evanescent. The inventors of the eucaines have, it may be, made a mistake in producing a substance resembling cocaine so closely in molecular constitution, and retaining the piperidinic nucleus, and with it the plainly toxic character of cocaine. Besides this, however, it must be borne in mind that chemists are not solely influenced by theoretical considerations, but are not seldom stopped by practical difficulties which they cannot get over, until some day a new method conceived by some one else permits the solution of the hitherto insoluble problem.

Until recent years, Teutonic industry, with the aid of perfectly equipped laboratories, a regiment of highly skilled chemists—and also, it must be added, the moral and effective support of all the scientific and medical branches of the nation —has monopolised the manufacture of synthetic pharmaceutical products. In France, just now, a slight reaction is to be noticed, and some manufacturers, more enterprising than others, are endeavouring to fight foreign competition by emulating the remarkable technical skill and consistent efforts of their neighbours. A French chemist, M. Fourneau,[2] director of the research laboratories of a well-known commercial house, has undertaken the systematic study of local anæsthetics. As a result of prolonged researches, he has been able to produce a series of fifteen bodies which all possess analgesic power to a marked degree. They belong to the amino-alcohols, and the essential point of difference between them and cocaine is that they do not possess the piperidinic nucleus which, as we have remarked above, is an element of danger. One of them, remarkable for its extreme simplicity, appears to be adapted above all others for use in practical surgery. This new analgesic derivative of tertiary amylic alcohol is, from a

[1] "La Cocaine en Chirurgie." Paris: Masson & Cie, 1903.

[2] Much of the material of this paper has been obtained from a communication made in March 1903 by M. Fourneau to the Academy of Medicine at Paris.

chemical point of view, the hydrochlorate of dimethyl amido B, benzoylpentanol, or, more simply, the hydrochlorate of amyleine A B (if we use Ladenburg's nomenclature). For purposes of convenience the name "Stovaine" has been given to it. It is prepared by the action of chloride of benzoyl on dimethyl amino-pentanol B, which is itself obtained by the action of bromide of ethyl magnesium on mimethylaminoacetone.

Stovaine crystallises in small, bright lamellæ very similar to those of hydrochlorate of cocaine, which are extremely soluble in water.

Aqueous solutions allow the precipitation of alkaloids of all the reagents, and up to the present no characteristic reaction distinguishing this substance from cocaine has been noted.

It is readily soluble in methyl alcohol and acetic ether. Absolute alcohol only dissolves one-fifth of its weight. It is soluble in acetone. It is very slightly acid to litmus paper and neutral to turmeric. Aqueous solutions can be readily sterilised by means of heat, as they remain unaltered even by prolonged boiling. After evaporation of a solution the alkaloid is found intact, and there is no trace of benzoic acid. The solutions can stand a temperature of 115° C. for twenty minutes in an autoclave. They slowly decompose at 120° C., and are therefore more stable than solutions of cocaine.

The physiological action of stovaine has been investigated by means of experiments on various animals, such as frogs, guinea-pigs, and rabbits.

The guinea-pig has, however, been found most suitable for this purpose.

The animals employed should be of the same weight and age, and, if possible, from the same litter.

Toxicity of Stovaine in the Guinea-Pig.—The fatal dose varies greatly according to the weight of the animal. In young animals 15 c.gm. per kilo. of the animal is fatal, and in the older 20 c.gm. per kilo. Females react more quickly to a dose than males, and animals which have been fed recently more quickly than those which are fasting.

Symptoms of a Fatal Dose.—The crisis commences seven to ten seconds after the injection. A slight trismus is the first thing to be noticed, and the animal seems ill at ease. If left in its cage it moves from side to side and keeps nibbling at

the bars. If liberated, the malaise is more noticeable still, and the animal seeks a quiet place to hide in. The true crisis begins with a paresis of the hind legs. Soon after, general tonic and clonic spasms of a violent character come on, succeeding each other rapidly, and not presenting any remission until the coma, which precedes the death of the animal by an hour or two, supervenes. The first of these attacks is invariably a tonic spasm. The animal falls on its right or left side, eyes widely open, limbs extended, and neck retracted in forced extension. This tonic phase may last two or three minutes. A chlonic phase with convulsive movements follows, the animal turns somersaults, and moves the anterior and posterior limbs of one side as if swimming. The tonic period may last some time, so that the animal seems to have got into a cataleptic condition. During these attacks salivation is common but is not usually profuse.

If a concentrated solution of 5 per cent. stovaine has been used, there is, generally speaking, no incontinence of urine; but if a dilute 1 per cent. solution be used, micturition is commonly seen, the actual quantity of water injected into the animal being greater.

At the commencement of the attack, dyspnœa is present, but soon passes off; when the injection is a toxic one, the number of the respirations progressively diminishes, and also they become shallower in character.

In four to six hours after the commencement of the crisis, according to the individual animal, the pulse is small, the cardiac pulsatic diminished, and the breathing irregular. At the same time the convulsive movements of the limbs relax, and the animal soon dies of asphyxia. During the crisis the reflexes, corneal-conjunctival-sphincteric and abdominal, are not sensibly altered, but appear rather exaggerated than otherwise.

Minimal Toxic Dose.—15 c.gm. in an animal of 600-800 gms.

With this amount only a slight amount of trismus is obtained and a little opisthotonos.

Strongly Toxic Dose.—18 c.gm. in a guinea-pig of 600-800 gms.

The symptoms are the same as with a fatal dose, but

shorter in duration (three to four hours). The convulsions cease, the animal makes an effort to stand up, and eventually succeeds in doing so.

After being put back into its cage it shows no further symptoms, but often begins feeding.

In pregnant females abortion is usually caused when a strongly toxic dose is administered.

Post-mortem.—Peripheral and intestinal vaso-dilatation is observed. The liver is congested and dark-red; the gall-bladder is often turgescent, the kidneys dark in colour, and the spleen unchanged. Slight hæmorrhages are to be noticed in the meninges. The lungs are congested and hæmorrhagic and emphysematous. Moreover, the animals die, as a rule, with symptoms of pulmonary congestion. There is no abnormal amount of fluid in the pleura.

The genital organs are also congested and hæmorrhagic, and in females carrying young, severe placental hæmorrhages have been noticed. Leucocytes and hæmatin crystals are found in the urine.

Action on the Temperature.—The action of a toxic dose on the body temperature is quite characteristic. In a few hours a fall of 8 degrees in temperature may be noticed. A female guinea-pig of 730 gms. was given a dose of 20 c.gm. approximately, at 1.50 P.M., when the body temperature registered 38.6° C. At 5.30 P.M. the temperature had fallen to 30.5° C. The animal died about 9 P.M. In this case the temperature fell about one degree per fifteen minutes, but in others the fall was even more rapid. With a minimal toxic dose no fall of temperature is noted, but in some cases even a rise.

The difference in the action of stovaine and cocaine—in toxic doses—on the temperature is noteworthy, for we find that cocaine, probably from its vaso-constrictor action, has exactly the opposite effect, and raises the temperature.

In 1887, Mosso, of Turin, demonstrated by experiment that this drug possessed a remarkable power over the body temperature, raising it independently of convulsions or section of the spinal cord, and he considered this to be due to direct changes in the tissues, or action of cocaine on the heat centres supposed to exist in the spinal cord. Reichert also confirmed this. He found that doses of 2 c.gm. per kilo. *in dogs* caused a rise of

from 2° to 4° C. Hare found the same. In short, cocaine is a powerful pyrogenic agent, while stovaine is equally powerful as a pyrolytic agent.

As regards the comparative toxicity of cocaine and stovaine, the following experiments are both interesting and striking.

A (1) A rabbit weighing 2 kilos. was injected intravenously with a 1 per cent. solution of cocaine.

At	3.43 P.M.	2 c.c. were put into the auricular vein.
	3.55 „	2 c.c.
	4.5 „	2 c.c.
	4.15 „	2 c.c.
	4.25 „	2 c.c.
		10 c.c.

At this stage death occurred.

A (2) A rabbit of the same weight was similarly treated with 1 per cent. stovaine solution.

At	3.50 P.M.	. . .	2 c.c.
	3.55 „	. . .	2 c.c.
	4.0 „	. . .	2 c.c.
	4.5 „	. . .	3 c.c.
	4.20 ,	. . .	2 c.c.
	4.25 „	. . .	2 c.c.
	4.30 „	. . .	2 c.c.
	4.35 „	. . .	2 c.c.
	4.38 „	. . .	1 c.c.
	4.43 „	. . .	1 c.c.
	4.47 „	. . .	1 c.c.
			20 c.c.

The rabbit survived the injections.

It is well known, however, that the rabbit is an animal which is very tolerant of cocaine, and also of stovaine, but, on the other hand, the guinea-pig is very sensitive to both drugs.

B (1) A guinea-pig of 640 grammes was treated with an intraperitoneal injection of 3½ c.c. of 1 per cent. solution of cocaine hydrochlorate at 5.57 P.M., and the animal died at 6.16 P.M.

B (2) A guinea-pig of 620 grammes was similarly injected

with 7 c.c. of 1 per cent. solution of stovaine at 6.14 P.M., and though it for some time showed signs of constitutional disturbance, it began to walk about at 7.25 P.M., and survived the treatment.

C (1) A guinea-pig of 480 grammes was injected in the back of the neck with 2½ c.c. of 1 per cent. solution of cocaine, and died in 15 minutes.

C (2) A guinea-pig of 390 grammes was similarly treated with 3½ c.c. of 1 per cent. solution of stovaine, and after about half an hour's malaise recovered completely.

It has been established that the fatal dose of cocaine for the guinea-pig does not exceed .05 gramme per kilo. This is the figure given by Livon.[1] From the experiments described we see that double this amount did not kill even young guinea-pigs.

We are therefore entitled to conclude that stovaine is much less toxic than cocaine, and perhaps to hope that its introduction into practical therapeutics will mark an advance over cocaine.

It must not be forgotten, of course, that similar claims to superiority have been made for almost all analgesics as they were introduced, but we think that the experiments described justify an attempt to introduce stovaine into the domain of practical therapeutic agents. M. Reclus has since 1903 been using stovaine in practical surgery and experimenting with it, but as yet has not published any note of his results.

The only record of the actual employment of stovaine in practical surgery which I have noticed is that of Chaput,[2] who has used this drug for lumbar puncture—"rachistovainisation"—and performed operations on the lower limbs, the perineum, the abdomen painlessly, while the patients were under its influence. He considers that its use is advantageous in the treatment of fractures and luxations of the lower limbs. He employs a 10 per cent. solution, and uses from 2 to 8 c.gm. of stovaine for each case. He finds that a needle perforated at the side instead of the end is the best to use with the syringe. A dose of 3 c.gm. of stovaine injected into the subarachnoid space is sufficient to allow of the performance of any operation on the perineal region, the foot or leg as far up

[1] "Dict. de Physiologie" (Richet), vol. iii. p. 932.

[2] *Revue de Chirurgie*, December 1904.

as the knee. A dose of 4 to 5 c.gm. provides a reliable analgesia for the performance of an operation on the thigh, or for the radical cure of inguinal hernia. Laparotomy is not a suitable procedure for which to use rachistovainisation, for the region involved cannot be rendered analgesic without involving the intercostal muscles.

Chaput finds the pulse to be slower, even during the occurrence of bleeding, the pupil contracts and blood-vessels dilate, with some consequent congestion of the face and the medulla. There is no risk of syncope. The after-effects are innocuous, and not noteworthy in any way. The patient can be fed immediately the operation is concluded, and any headache or backache that may be present is slight in degree. There is no elevation of temperature as seen with rachicocainisation. Retention of urine does not usually occur, even if the anal region be the seat of operation. Chaput has not seen any untoward results from the use of stovaine.

Summary of the Advantages of Stovaine as a Local Anæsthetic.

1. Its low degree of toxicity. It is less toxic than eucaine α or β, according to Pouchet, while it is only one-third or one-fourth as toxic as cocaine, the fatal dose of this latter drug being only 5 c.c. in the guinea-pig, while that of stovaine is 15-20 c.c.

2. Stovaine is a vaso-dilator, while cocaine is a vaso-constrictor. This fact is of great practical importance, for the tendency to sudden syncopic attacks, always present when even moderate doses of cocaine are used, is absent when we use stovaine, and, consequently, in any surgical procedure under stovaine we are able to use the sitting-up position without any misgiving.

3. Solutions of stovaine can be sterilised by boiling, as they do not decompose in any way until a temperature of 120° C. is reached.

4. Stovaine has no tendency to induce hyperpyrexia, even when injected into the spinal meninges; the occurrence of very high temperatures after the use of cocaine in this manner we know to be quite common.

5. Stovaine is considerably less costly than cocaine, a fact of some importance in hospital work.

6. As regards the actual analgesic power, stovaine seems to be practically equal to cocaine, although it may be at times a little less intense in action. The one *disadvantage* which we are aware of is that stovaine cannot be used along with adrenalin solution, for if it is, the skin at the point of injection becomes gangrenous. When we bear in mind that the chief advantage of adrenalin is localising the action of the cocaine and preventing constitutional symptoms (in view of the low toxicity of stovaine), we realise that this disadvantage is but a slight one.

OBSERVATIONS ON METABOLISM DURING THE ADMINISTRATION OF CERTAIN HARROGATE WATERS

By WILLIAM BAIN, M.D., M.R.C.P.

OUR knowledge of the action of natural mineral waters is mainly empirical. Their pharmacological action has only been partially ascertained. Three Continental observers estimated the osmotic pressure of the blood during the exhibition of the Neuenahr waters, but they obtained discordant results. One of these, Grube (1), came to the conclusion that the blood was more concentrated after the waters, and he ascribed this condition to their diuretic properties.

Analysis of the urine, and, in some instances, examination of the blood, have *been* undertaken, but these investigations were generally carried out on healthy subjects. This paper deals chiefly with observations made during the administration of certain Harrogate waters in a case of chronic articular rheumatism. A brief description of the case will suffice.

History.—W. D., aged 31, came under observation in August 1900. He had acute rheumatism twice, the first attack in 1885 and the second two months ago. He did not suffer from palpitation or shortness of breath, his appetite was good, and he slept well. He complained of pain and stiffness in several joints.

Physical Signs.—On examining the heart, a loud, rumbling, systolic murmur was heard at the apex, and the second sound in the pulmonary area was markedly accentuated. Some of the joints were much enlarged, notably the knuckles of both hands, and the right elbow and shoulder. He suffered also from psoriasis. It began immediately after the first attack of acute rheumatism, and was fairly extensive. During the investigation he took a constant amount of exercise daily, and was placed on the following fixed diet :—

Breakfast.—2 eggs, 3 oz. toast, ¼ oz. butter, and 1 cup of tea.

Luncheon.—1½ oz. ham, 1½ oz. water biscuits, and a glass of water.

Tea.—2½ oz. water biscuits, ¼ oz. butter, 1 cup of tea.

Dinner.—3½ oz. mutton, 3½ oz. potatoes, 1½ oz. toast, 1½ oz. cheese, 1½ oz. banana, and a glass of water. A glass of water at bedtime.

From August 9th to 13th inclusive he took 20 oz. Kissingen water before breakfast, and 10 oz. chloride of iron water at 12 and 4. From August 14th to 17th inclusive he took 20 oz. strong sulphur water before breakfast, and 10 oz. mild sulphur at 12 and 4. All these waters were taken warm. It may be mentioned here that the patient derived more benefit from the sulphur than from the chalybeate waters. He was six weeks under treatment, and when he left his joints appeared normal.

Finding that the sulphates were diminished while the sulphur water was being administered, it was given to a healthy subject in order to ascertain if the decrease was a pathological or a physiological result. The diet in this case was somewhat different from the one detailed, but the other experimental conditions were similar.

Methods of Analysis.—The urea was estimated by the hypobromite method, the uric acid by Hopkin's process, and the phosphorus pentoxide by titration with uranium acetate. For the estimation of the acidity, titration with decinormal caustic soda was employed, phenol-phthalein being the indicator. The sulphates were estimated by the volumetric method with barium chloride, and the chlorides by Mohr's method. The results are here tabulated :—

TABLE I.—Showing the Analytical Details of the 24 hours Urine in a case of Chronic Articular Rheumatism.

Date. 1900.	Waters given.	Quantity in c.c.	Reaction.	Urea in grams.	Sulphates in grams.	Uric Acid in grams.	P_2O_5 in grams.	Chlorides in terms of NaOH in grams.	Acidity in terms of Oxalic Acid in grams.
August 5	Fixed Diet . .	1670	Acid	30.06	2.62	.564	2.08	8.85	2.78
„ 7		1020	Acid	29.48	2.49	.593	2.24	9.17	2.73
„ 8		865	Faintly acid	28.78	2.44	.526	1.98	9.16	2.83
„ 9	Kissingen & Chloride of Iron .	1130	Faintly acid	30.51	3.16	.548	1.98	9.94	1.90
„ 10		1500	Faintly acid	29.50	3.75	.510	1.89	10.65	1.89
„ 11		2340	Faintly acid	30.42	4.09	.535	1.92	10.99	2.59
„ 12		1270	Amphoteric	30.40	3.17	.486	1.70	11.89	1.99
„ 13		1560	Amphoteric	31.35	3.21	.474	1.68	11.12	1.96
„ 14	Sulphur Waters .	1050	Faintly acid	30.45	2.41	.515	1.99	16.82	3.17
„ 15		945	Acid	31.35	2.36	.500	1.89	17.01	3.51
„ 16		1100	Distinctly acid	30.25	2.33	.521	1.95	13.10	4.11
„ 17		970	Distinctly acid	29.48	2.32	.510	1.90	13.58	4.37

TABLE II.—Averages.

	Urea.	Sulphates.	Uric Acid.	P_2O_5.	Chlorides.	Acidity.
Fixed Diet (3 days) . .	29.44	2.52	.561	2.10	9.06	2.78
Iron Waters (5 days) . .	30.44	3.48	.511	1.84	10.92	2.07
Sulphur Waters (4 days) .	30.38	2.35	.511	1.93	15.13	3.79

TABLE III.—Showing the Analytical Details of the 24 hours Urine in a Healthy Subject.

Date.	Waters given	Quantity in c.c.	Urea in grams.	Sulphates in grams.	Uric Acid in grams.	P_2O_5 in grams.	Acidity in terms of Oxalic Acid.
1900—September 16	Fixed Diet	920	31.74	1.97	.525	2.16	3.24
„ 17		1750	31.50	1.92	.477	1.97	3.08
„ 18		1430	29.17	1.85	.496	2.06	2.45
„ 19	Strong Sulphur Water	1135	32.12	1.79	.425	1.75	3.05
„ 20		1280	31.16	1.79	.435	1.79	3.53
„ 21		1610	30.59	1.76	.476	1.99	3.43

TABLE IV.—Averages.

	Urea.	Sulphates.	Uric Acid.	P_2O_5	Acidity.
Fixed Diet (3 days)	30.80	1.91	.499	2.06	2.92
Sulphur Water (3 days) . . .	31.29	1.78	.445	1.84	3.33

It will be observed that the results in both the rheumatic and in the healthy subjects are very similar (1). There is a moderate increase in the urea during the administration of the sulphur and the chalybeate waters. This effect has been noted before, and is probably due to stimulation of the liver (2). I have shown that not only the sulphur but also the Kissingen waters increase the flow of bile (3). The large quantity of fluid taken would scarcely account for this augmented excretion.

The diminution in the excretion of uric acid under sulphur water is probably in part due to the removal of its antecedents from the alimentary canal by purgation; ingestion of large quantities of fluid also has an influence in diminishing the output. The importance of this nitrogenous end-product has been somewhat exaggerated, and some imaginative writers ascribe to it many of the ills that humanity is heir to. With respect to the phosphorus pentoxide, it generally bears a direct ratio to the uric acid excretion, provided the subject rigidly adheres to the fixed diet.

The sulphates were diminished during the exhibition of the sulphur water. This is obviously due to the aperient action of the water. A purgative action practically means that the subject becomes carnivorous; hence his urine is more acid. The rheumatic patient took Carlsbad Salts with the Kissingen water, and this explains the increase in the sulphates while the chalybeate waters were being used. The chlorides being normally derived from the salts of the food, an increase after waters rich in chlorides was to be expected.

In addition to the effect of these waters on metabolism, their action in determining osmosis should also be considered. The strong sulphur water contains 1.25 per cent. sodium chloride. Solutions of this substance have a marked effect on the processes of diffusion and osmosis. When a salt solution of lower molecular concentration than the blood is introduced into the alimentary canal, in other words, a hypisotonic solution, it is readily absorbed, chiefly through osmotic attraction. When the solution is isotonic with the blood it is less readily absorbed. Hyperisotonic solutions like the sulphur waters withdraw fluid from the blood, thereby raising the osmotic pressure. Diuresis has a similar effect by abstracting fluid from the blood; some of the Harrogate waters are markedly

diuretic. When the osmotic pressure of the blood is raised there is a transference of fluid from the tissues into the blood; the blood as a consequence becomes hydræmic and the capillary pressure raised. This increase in the capillary pressure induces a flow of lymph from the blood into the lymph spaces. These recurring changes in the molecular concentration of the blood promote lymph flow, and must have a very marked influence on nutrition.

Another important property of sodium chloride is that in solution it readily dissociates into its sodium and chlorine ions. Both its electrolytic conductivity and its osmotic pressure increase in proportion to the number of molecules that are dissociated in the solution, therefore moderately dilute solutions play a very active part—no other salt is so active in this respect—in facilitating the interchange of fluid between the blood and the lymph.

In estimating the value of a mineral water, we must bear in mind not only the effect on the excretionary products, but also its physico-chemical properties, which have a considerable influence on chemical pathology.

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Clinical Record

TWO CASES OF CONCEALED ACCIDENTAL HÆMORRHAGE IN THE EARLY MONTHS OF PREGNANCY

By ROBERT JARDINE, M.D., F.R.S.E.,
Professor of Midwifery in St Mungo's College, Senior Physician to the Glasgow Maternity Hospital, &c.

ACCIDENTAL hæmorrhage is generally said to occur from the sixth month of pregnancy on to full time. When hæmorrhage

occurs before the sixth month it is usually spoken of as due to an abortion or miscarriage. As a matter of fact, the bleeding from an abortion or a miscarriage is as much an accidental hæmorrhage as the so-called accidental hæmorrhage of the later months of pregnancy. The only difference is that in the former case the fœtus is not viable, while in the latter it may survive, if born alive. As a rule, the hæmorrhage of an abortion or miscarriage is an external one, *i.e.* there is little or no clot retained in the uterus, but this is not invariably true, as the following cases prove.

CASE I. Mrs G., vi-para, æt. 29. This patient came to hospital complaining of "losing." She had borne five children, the last being six months old. Following the birth of the last child there had been a period of amenorrhœa, lasting for four months. She had then menstruated. She had also had an ordinary period of four days at the end of the fifth month, and at the end of the sixth month the discharge had come on again, but had not ceased up to the time of admission. She had passed a good many clots, but no solid substance. Prior to this she had not imagined that she was pregnant, as she had had none of the ordinary indications, such as morning sickness. She had not been able to nurse her baby, as there had not been sufficient milk in her breasts. She had never noticed anything like vesicles in the discharge.

On examination the abdomen was found to contain a tumour of a somewhat doughy character, and not unlike a pregnant uterus. The top of the tumour extended to within an inch of the umbilicus, and, as the patient admitted that she had had connection within five weeks of delivery, the question came to be—was it a pregnant uterus of five months? By the vagina a multiparous cervix was felt, which was not much softer than the non-pregnant variety. Bimanually the tumour was easily made out to be the uterus. Vaginal pulsation could be felt. No ballottement could be made out, and there was no fœtal heart or uterine souffle to be heard. There was practically no discharge, and the os was quite closed.

We decided to keep the case under observation for a few days. During the following week there were several slight attacks of bleeding. The discharge was usually of a dark treacley nature. There was no increase in the size of the uterus.

Nine days after admission I explored the uterus, after dilating the cervix with Hegar's dilators. On passing the fingers into the uterine cavity, I found the lower part was full of dark clotted blood. When this clot was broken down and

washed out, the intact ovum was found attached to the left cornua of the uterus. The lower edge of the placenta was slightly separated from the uterine wall, and it was from here the bleeding had evidently occurred. The uterus was completely emptied. Fully two-thirds of the cavity had been occupied by clot. The uterus contracted well, and there was no post-partum hæmorrhage. The patient made an uninterrupted recovery.

CASE II. Mrs B., xii-para, æt. 43. This patient was admitted on account of bleeding of a week's duration. All her other pregnancies had gone to full time, and the children had been born alive without difficulty. She had never had a mishap. The last menstruation had been in the beginning of January, and she had seen nothing from that time until a week before admission on May 16. Her last child had been born two years ago, in January. During the last week clots had come away, but now and then dark fluid blood, and at times water (serum ?). The patient had had none of the usual indications of pregnancy, and in fact she had ascribed the cessation of menstruation to "the change of life." She had not had any accident. The bleeding had come on when she was sitting at her fireside. She said the belly had begun to swell about three months previously, and it had increased considerably in size during the last two months, but there had never been any sudden increase.

The os was tightly closed, and there was no bleeding at the time of examination. The uterus was the size of a seven months' pregnancy. It was of a doughy consistence, and no fœtal parts could be made out. No fœtal heart sounds nor uterine souffle could be heard. The breasts were quite lax, and no milk could be expressed.

The similarity of this case to the one just related convinced me that we had to deal with a case of concealed accidental hæmorrhage in the early months of pregnancy.

On the next and following day there was some bleeding. The vagina was then firmly plugged, and when the plug was removed the cervix was dilated sufficiently to allow of exploration of the uterine cavity. Just as in Case I., I found the lower part of the uterine cavity was full of black clot. The patient refused to allow me to treat her, and insisted on going home. I do not know what the end of the case was, but probably the uterus would empty itself. I could not reach the ovum, but I have no doubt it was attached in the upper part of the uterus.

In "Clinical Obstetrics" I have recorded a case very similar to these two, but it was complicated with an old retrocæcal abscess

which had burrowed down by the side of the cervix, and discharged by a small opening just within the external os.

It is difficult to understand why such a large quantity of blood should have been retained in the uterus. In all of these cases there was sufficient clot to distend the uterus to fully twice the size it should have been. In all of them there were repeated external bleedings, but in none of them anything like a serious flooding. Another rather remarkable feature was that there was very little pain. The internal os was tightly closed. Clot in the uterus is a foreign body, and, as a rule, it brings on uterine contractions, but in these cases it failed to do so. There must have been a want of tone about the uterus, but there was no evidence of this in the two cases which I cleared out, as in both retraction immediately took place.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

THE tenth and last ordinary meeting of the Session was held on July 5—Prof. John Chiene, C.B., President, in the chair.

A letter was read from Professor Röntgen acknowledging his election as an honorary member of the Society.

Dr Allan Jamieson showed a case of granulosis rubra nasi in a boy of 9.

Dr W. T. Ritchie, for Dr Gibson, showed two cases of syringomyelia.

Mr Cotterill showed: (1) a case of parotid tumour of doubtful nature; (2) a case of perforating ulcer of the foot in a patient not suffering from locomotor ataxia, but from a local neuritis.

Mr Cathcart showed: (1) a patient after wiring of a fractured femur for mal-position; (2) a patient after elevation of a very extensive depressed simple fracture of the skull.

Mr Struthers showed: (1) a patient after radical cure of an inguinal hernia under local anæsthesia; (2) a patient after excision of the astragalus for compound subastragaloid dislocation.

Mr Cotterill exhibited a series of gall-stones, and a series of damaged semi-lunar cartilages from the knee.

Mr Alexis Thomson exhibited a specimen from a case of cholecystectomy for gall-stones and pendulous gall-bladder, and an enlarged prostate and vesical calculus removed by suprapubic operation.

Mr Caird showed specimens of diseased kidneys.

Dr Michael Dewar read a paper on the recent epidemic of influenza, which will appear in the *Journal.*

Mr Caird demonstrated the urine separator of Luys, and Mr Cathcart and Mr Wallace made remarks.

Dr T. D. Luke read a paper on post-anæsthetic sickness.

Mr MacGillivray said he had seen more sickness following the use of sequences than after a single anæsthetic.

Mr Guy was of opinion that the incidence and severity of sickness varied directly with the dose. He had found that practically no sickness followed the use of gas and ethyl chloride, and that sickness followed the use of ethyl chloride alone in about fifteen per cent. of cases.

The paper was also discussed by Mr Wallace and Drs MacCallum, Gulland, and James Ritchie.

Forfarshire Medical Association

THE 47th Annual Meeting of the Forfarshire Medical Association was held in Montrose, on Thursday, July 6th. Dr Key, Montrose, the President, was in the chair, and after the passing of the minutes of last ordinary meeting the Secretary read the Council's annual report and the financial statement, which were approved. Dr Rorie, Dundee, then moved, and Dr Grant, Montrose, seconded, a motion for the election of office-bearers for the ensuing year, which was as follows:—President, Dr Sinclair, Dundee; Vice-Presidents, Dr Lennox, Dundee; and Dr Peterkin, Forfar; Treasurer, Dr Foggie; General Secretary, Dr G. W. Miller; Reporting Secretary, Dr Kerr; besides local Secretaries for Montrose, Arbroath, and Forfar, and six members of Council. The President then gave a short criticism of the Act for the Notification of Infectious Diseases, and in a discussion which followed, taken part in by most of those present, the general opinion expressed was that the list of compulsorily notifiable diseases might be usefully amended, diseases such as erysipelas and typhoid fever being left out, and others, such as measles, whooping-cough, and phthisis included. The great objection, however, to the last was the expense that would be incurred. The company then adjourned to dinner, when amongst the guests were Dr Angus Fraser, Aberdeen; Mr Scott Riddell, Aberdeen; and Provost Melvin, Montrose. Letters of apology were read from Professor Ogston, Aberdeen; Professor Musgrove, St Andrews; Dr Douglas, Cupar Fife; Fleet-Surgeon Lory, of the *Unicorn*, and several others. In the course of the function, Dr Halley, Dundee, was made the recipient of a testimonial in recognition of his seven years' service as Secretary.

Births and Deaths registered in Eight of the Principal Towns of Scotland during June 1905

DURING the month of June 1905 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4408 living children, of whom 2224 were males and 2184 females. These births are equivalent to an annual birth-rate of 30.7 per thousand of the estimated population of these towns, a rate which is 1.7 less than that for May, and 0.7 less than that for June 1904. The birth-rate for the month was highest in Greenock, 37.4, and lowest in Edinburgh, 26.6. In Leith it was 32.0; in Glasgow, 31.8; in Aberdeen, 31.7; in Dundee, 30.0; in Paisley, 29.2; and in Perth, 28.1.

Of the 4408 children born during the month, 296, or 6.7 per cent., were illegitimate. This illegitimate rate was highest in Perth, 8.9, and lowest in Paisley, 4.4. In Aberdeen it was 8.3; in Dundee, 8.1; in Edinburgh, 7.8; in Glasgow, 6.1; in Leith, 6.1; and in Greenock, 5.6.

Deaths registered during the month numbered 2308, of which 1153 were of males and 1155 of females. The equivalent annual death-rate is 16.1, a rate which is 2.6 less than that for May, and 0.5 less than that for June 1904. The actual number of deaths is 471 less than those registered in May, and 51 less than the deaths registered in June 1904. The highest death-rate for the month was registered in Perth, 19.6, and the lowest in Leith, 11.1. In Glasgow it was 17.2; in Greenock, 17.2; in Paisley, 16.8; in Edinburgh, 15.4; in Dundee, 15.3; and in Aberdeen, 13.4. In Greenock and in Perth the death-rate was higher than it was in May; in the remainder of these towns it was less than in that month.

Of the 2308 deaths, 776, or 33.6 per cent., were of children of less than five years old; and 526, or 22.8 per cent., were of persons of over sixty. Compared to the deaths registered in May, those of children of under five are 242 fewer, and the deaths of persons of over sixty 155 fewer.

The deaths of children of less than one year old numbered 447; this is 114 fewer than those in May, 9 fewer than those in June 1904, and equivalent to an infantile mortality of 110 per thousand births, a rate which is 23 less than that for May, but the same as that for June 1904. The infantile mortality rate was highest for the month in Perth, 179, and lowest in Leith, 41. In Edinburgh it was 131; in Paisley, 124; in Glasgow, 115; in Greenock, 105; in Aberdeen, 90; and in Dundee, 84. In Edinburgh, Paisley, Greenock, and Perth this

rate was higher than it was in May, while in Glasgow, Dundee, Aberdeen, and Leith it was lower than in that month.

The principal epidemic diseases were the cause of 239 deaths. This number is 89 less than that in May, and 17 less than that in June 1904; and is equivalent to an annual death-rate from these causes of 1.7 per thousand. This rate for the month was highest in Glasgow and Perth, in both of which towns it was 2.1, and lowest in Aberdeen, where it was 0.3. In Edinburgh it was 1.9; in Greenock, 1.6; in Paisley, 1.4; in Dundee, 0.8; and in Leith, 0.7.

There were no deaths from smallpox. Deaths from measles numbered 84, which is 48 fewer than in May, but 21 more than in June 1904. Deaths from whooping-cough numbered 109, which is 13 fewer than in May, but 4 more than in June 1904. Deaths from scarlet fever numbered 6; from diphtheria, 10; from enteric fever, 9; and from typhus fever, 1. Deaths from diarrhœas numbered 20, which is 7 fewer than in May, and 19 fewer than in June 1904.

Deaths from influenza numbered 12; this is 4 fewer than in May, but 5 more than in June 1904.

There were 9 deaths from puerperal septic conditions; from malignant disease, 142; of them 67 were ascribed to carcinoma, 8 to sarcoma, and 65 to cancers not otherwise defined. Deaths from heart disease numbered 208; from apoplexies, 114; from premature birth debility, 75; and from alcoholism, 7.

Deaths from pneumonia numbered 211, and constituted 9.1 per cent. of the total deaths; while those from bronchitis numbered 103, and constituted 4.5 per cent. of the total deaths. Deaths from pneumonia were 99 fewer than in May, but 2 more than in June 1904; those from bronchitis were 68 fewer than in May, and 22 fewer than in June 1904.

Deaths from phthisis numbered 224, and constituted 9.7 per cent. of the total deaths. They were 28 fewer than in May, and the same number as in June 1904.

Editorial Notes and News

The R.C.S. Quatercentenary.

THE much-talked-of four hundredth anniversary has come and gone, and the surgeon may look back on it with pride and satisfaction. Everything went well. Even the weather, which so often interferes with at least one day of such festivities, was on

its best behaviour, and every one of the functions might have been held out of doors.

Although all the honorary fellows did not turn up, the more famous of them did, and they must indeed be hard to please if they were not gratified with their reception.

Of all the functions, perhaps the most brilliant was the concluding banquet in the Music Hall, where the uniforms and decorations worn by many of the Fellows and guests were positively dazzling.

We cannot conclude this brief notice, written just as we go to press, without an allusion to the magnificent speech made by Sir William Turner in proposing "The Guests." Its delivery, its felicity of expression, its cordiality, and the grace of its allusion to France, called forth by the presence of the Ambassador, with whose name the toast was coupled, made all Edinburgh men present proud of their Principal.

The University most graciously and fitly closed the celebrations by bestowing the LL.D. on several of the newly elected foreign Fellows.

The International Conference on the Blind.

THE International Conference dealing with subjects relating to the improvement of the condition of the blind was held this year in the Central Halls, Tollcross, Edinburgh, the various meetings extending from June 19th to 24th. In connection with the Conference there was an extensive exhibition of educational and technical appliances and apparatus used in the instruction and training of the blind, as well as a comprehensive collection of manufactures by blind persons. Discussions were held on the education of blind children, on the education of blind persons over 16 years of age, on the care of the defective blind, on the employment of the blind, and other subjects.

Although the care of the blind, their education, and their employment are not subjects of special medical interest, it is natural that medical men should take a good deal of interest in the blind as a class. Indeed, the medical profession may justly claim the credit of the gradual but steady diminution in the proportion of blind in the general population which is known to have been going on for many years. In the year 1851 there was 1 blind person in every 979, while the last census returns show that the proportion has fallen to 1 in 1285. No doubt a part of this diminution is due to improvements in industrial conditions, to the better lighting of mines and public works, and to shorter hours of labour; but by far the greater amount must be due to the practical disappearance of epidemic smallpox, formerly

responsible for so much blindness; to advances in the methods of treating affections of the eye, such as glaucoma; and to the prophylactic treatment of the eyes of new-born infants, whereby ophthalmia neonatorum may usually be prevented.

In the discussion on the defective blind there was a general agreement that children of that class should be sent to a special institution, and should not be taught along with blind children otherwise normal. Not only is it bad for the ordinary children to associate much with defectives, but the latter require individual attention if any results worth having are to be obtained. The question of whether such defectives should be retained under care for life was touched upon, but this problem is the same as that presented by defectives who can see.

Mr Illingworth said there would not be so many of the blind mentally and physically defective if the children were sent to school at an earlier age. The Act of Parliament laid it down that blind children should be sent to school at five years of age, but that instruction was not observed, the average age at which blind children were sent to school being nearer seven or eight years. This is a point which it may be worth the while of medical men to note, as they must often have a voice in the decision when a child is to be sent to school. There can be little doubt that the principal reason why the children are not sent so early as Mr Illingworth desires is to be found in the pity excited by the child's misfortune, and the feeling that it would be very hard on a little thing of five, probably delicate and certainly unusually dependent on its guardians, away from home at so tender an age. Such feelings are natural and proper enough, but what the medical man has to realise is that it is absolutely necessary for the blind child to learn habits of self-reliance at as early an age as possible. All teachers of the blind agree that the greatest difficulty they have in dealing with the children entrusted to them is to teach them confidence in themselves. At home the children are often so carefully looked after for fear of accidents, so carefully prevented from attempting the usual childish accomplishments, that a good deal of time at school has often to be devoted to teaching them what they should have learned at home. There can be no doubt that Mr Illingworth, who, of course, speaks from a very large experience, is right in desiring that blind children should be sent early to an institution where they can be trained by specialists, and enjoy the companionship, and be encouraged by the example of their fellows in misfortune.

The employment of the blind was a subject of discussion which was evidently of much interest to those taking part in the conference, and the exhibition of work must have been a

revelation to many of the visitors. Weaving on the Swedish hand-loom was shown in operation by workers from the institution at Nottingham. Needlework and basket-work were exhibited in great variety and profusion, and the woodwork shown, if less abundant, was of the highest standard as regards neatness and substantiality. Amongst the educational appliances were numerous raised maps, a variety of typewriters, and a surprising abundance of literature. Amongst occupations for the blind we may specially mention massage, of which an exhibition was given in one of the side-rooms.

Royal College of Physicians of Edinburgh.

A QUARTERLY Meeting of the Royal College of Physicians of Edinburgh was held on Tuesday, July 18, 1905—Dr Playfair, President, in the Chair.

Admission to the Fellowship.—George Pratt Yule, M.D., M.R.C.P.E., Government Offices, Bloemfontein, was admitted by Ballot to the Fellowship of the College.

Admission to the Membership.—Charles John Shaw, M.B., Ch.B., Murthly, was admitted by Ballot to the Membership of the College after examination.

Admission to the Licence.—The Registrar reported that since the last Quarterly Meeting 24 persons had obtained the Licence of the College by examination.

Curriculum and Examinations.—The Regulations regarding the Single Licence and Membership and Fellowship of the College for the ensuing year, and the Regulations for the Triple Qualification, were approved.

School of Medicine of the Royal Colleges.—The Secretary laid on the table the Annual Statement by the Governing Board of the School of Medicine of the Royal Colleges, in terms of the constitution. The report indicated that the number of classes during the Winter Session, 1904-05, was 39, and during the Summer Session, 1905, 43; and that the number of Students during the Winter Session was 1122, and during the Summer Session, 1237, both so far as could be ascertained, as certain Lecturers had not made returns.

Freeland Barbour Fellowship.—The Freeland Barbour Fellowship was awarded to Benjamin P. Watson, M.B., Ch.B.

Hill Pattison-Struthers Bursary.—The Hill Pattison-Struthers Bursary in Clinical Medicine, which is in the gift of the College, was awarded, after examination, to Mr Robert Murray Fraser, L.R.C.P.E., L.R.C.S.E.

Expulsion of Licentiate.—By vote of the College, Richard Henry Darwent, a Licentiate of the College, was expelled from

the College and deprived of his Licence to practise, as granted by the College, and of all his rights and privileges as Licentiate.

The Chair of Obstetrics.

IT is matter of much satisfaction to know that the University Court has definitely decided to bring about the separation between the subjects of Obstetrics and Gynæcology, for their work is well begun, and we wish them well through the further negotiations.

Everyone who has gone into the matter appreciates the fact that there are difficulties to solve. It would obviously be the easiest solution to separate the course into two of fifty lectures each. This would permit of their being made summer courses, and greatly relieve the final years, pending the re-arrangement of the curriculum, when the three-term system is put in force. We learn, however, that some Obstetricians hold that fifty lectures is not enough for their subject, though they admit that a hundred is too many. This is a matter about which, we presume, there will always be difference of opinion, and we earnestly hope that the question will be approached from the large position of the good of the whole school, and that the *amour propre* of the teacher of any individual subject will be allowed its proper influence and no more. Under the new arrangements at the Maternity, which we would be glad to see even more loyally supported by the dispensaries, the student's opportunities of learning Midwifery properly are greatly enlarged, and we have no doubt that before long he will show greater readiness to take advantage of them.

The Infirmary difficulty will require delicate handling, but should not be unsurmountable. It is true that it has been the custom to elect to University lectureships the holders of certain posts in the Infirmary, and that it is unlikely that the University will in this instance consent to that plan being followed. We suppose we are too sanguine in hoping that the solution will be found in appointing the new lecturer as Extraordinary Professor, but that is the easiest way out of a difficulty.

Is it too much to suggest that the opinion of all the teachers in the school, extra- as well as intra-mural, should be allowed their proper weight?

School of Medicine of the Royal Colleges, Edinburgh.

AT a meeting of the Governing Board of the School of Medicine of the Royal Colleges, Edinburgh, the Secretary and Registrar, Mr R. N. Ramsay, reported that the number of students attending the school during the winter session, 1904-5,

was 1122, and during the summer session, 1905, the number was 1237.

The Scottish Medical and Surgical Journal, Limited.

THE annual meeting of the shareholders of the *Journal* was held on July 13, by the kindness of Mr Annandale, in 34 Charlotte Square, Mr Joseph Bell in the chair.

The directors submitted to the shareholders their fifth annual report, with balance-sheet as at 31st December 1904.

They were glad to report that the *Journal* had had a successful year, and was becoming more and more established in its position as one of the best monthly medical journals.

The balance at the credit of the profit and loss account amounted to £46, 1s. £40 of this was applied in writing off preliminary expenses, which are thus reduced to £20, leaving the sum of £6, 1s. to be carried forward.

The three retiring directors, Dr Clouston, Dr Hodsdon, and Dr M'Kenzie Johnston, were unanimously re-elected.

The auditor, Mr G. A. Robertson, C.A., was re-elected.

Votes of thanks to the chairman, the officials, and to Mr Annandale, concluded the proceedings.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Faculty of Physicians and Surgeons of Glasgow.

THE quarterly examinations of the above Board, held in Edinburgh, were concluded on 18th inst., with the following results:—

First Examination, 4 years' course.—Mr James Edmund Syme, Egremont, Cumberland, passed the examination.

First Examination, 5 years' course.—Of 32 candidates entered, the following 13 passed the examination:—Frederic Charles Eberhardt, London; Robert William Axon Brown, Chester; Shavaksha Beramjie Mehta, Aden; Beatrice Coxon, Northumberland; Dora Robbins, Poona; Kaikhusen Sorabshah Commissariatwalla, Bombay; Cesar Jenaro Lacayo, Granada; Byramjee Shavakshah Tarapurwalla, Bombay; Maneckji Burjorji Patel, Bombay; John Paxton, Norham-on-Tweed; Richard Fraser Lunn, Edinburgh; James Morham, Edinburgh; and Ratilal Rangildas Bakshi, Jamnagar; and 5 passed in Physics, 7 in Biology, and 2 in Chemistry.

Second Examination, 5 years' course.—Of 43 candidates entered, the following 24 passed the examination:—George

Hector Urquhart, Eskbank; Kaikhusen Sorabshah Commissariatwalla, Bombay; Maneckji Burjorji Patel, Bombay; Cecil Berry, Wigan; Arthur Edwin James, Auckland, New Zealand; Norman Grenville Walshe-Davidson, Ballycastle; Edmund Eccles, Lancashire; Joseph Henry Bennett, Clonakilty; Rodolphe Edouard Laurent, Mauritius; Robert George Sherlock, Jamaica; Effie Jemima Cassels, Glasgow; Henry George Ramsbottom, Lancashire; Oliver Carlyle, London; Richard Baron Michael Sullivan, Wicklow; Charles Caldwell Campbell, Melbourne; Maria Shepherd Allen, Cheadle; Easton Spence Shiach, Dunfermline; Andrew Johnstone Brown, Edinburgh (with Distinction); Marguerite Alice Christian Douglas, Cape Town; James Bolton Kelso, Co. Derry; Ernest Gibson, Co. Cork; William Rutherford Waddell, Belfast; Cornelius Alexander O'Driscoll, Co. Cork; and Thomas Boston Johnstone, Edinburgh; and 2 passed in Anatomy, and 3 in Physiology.

Third Examination, 5 years' course.—Of 29 candidates entered, the following 20 passed the examination:—Syed Imtiaz Hasan, India; Herbert Charles Orrin, Colchester; John Hugh Simpson, New Zealand; Henry James Gorrie, Dundee; Ada Geraldine Boylette, Bombay; Harry Ferguson Shepherd, Ireland; Robert Kay Nisbet, Edinburgh; Taylor David Murison, Edinburgh; Howard Douglas Stuart, London; Alexander Rae, Port Gordon; George Edward Anderson, Arbroath; George Ernest Nash, Co. Cork; Arthur Melville Davie, Glasgow; Harold Hubert Babington, Ireland; John Scott Ward, Co. Cork; Ethel Adelaide Orchard, Victoria; Nathaniel Moxon, St Helens; Robert Frederick Claude Hamilton Buchanan, Thirsk; Charlotte Eliza Pring, Bristol; and Constance Colley, Dublin; and 1 passed in Pathology.

Final Examination. — Of fifty-one candidates entered, the following twenty-four passed the examination and were admitted L.R.C.P.E., L.R.C.S.E., and L.F.P.S.G.:—Robert Murray Fraser, Edinburgh; Mary Caroline Hamilton, London; George Augustus Stewart Hamilton, Dublin; Louis Leonard Carlos, Cochin, India; Robert Wearing, Accrington; Andrew Frederick Demary, Canada; Tom Newman Darling, Reading; Harry Alfred Bray, Canada; James Ninian George William M'Morris, St Johns, N.F.; John William Pell, London; John Ker Lindsay, Edinburgh; Edward Parker, Haythornthwaite, Cumberland; Arthur Lloyd Pereira, Colombo; George William Barber, Ontario; John Walker Wigham, Toronto; Charles Chaves, India; Edward Francis Nyhan, Co. Cork; Anson Scott Donaldson, Canada; Albert Edward Tanner, Calicut; Philip De Mello, Bombay; John James Matheson, Ontario; John Stothart Farries, Dum-

friesshire; James Reginald Purcell, Co. Meath; and James Williamson Skelley, Govan; and three passed in Medicine and Therapeutics, four in Midwifery, and six in Medical Jurisprudence.

TAM AND THE LEECHES

FAITH, there's a hantle queer complaints
To cheenge puir sinners into saints,
And mony diverse weys o' deein'
That doctors hae a chance o' seein'.
The Babylonian scartit bricks,
And tellt his doots o' Death's dark tricks;
The Roman kentna hoo 'twas farin'
Across the ferry row'd by Charon;
And, tho' we grummle at the load
We hae to bear alang Life's road,
Yet when we're fairly at the bit
We're a' maist awfu' sweer to flit;
And gangrels, croochin' in the strae,
To leave this warl' are oft as wae
As the prood laird o' mony an acre,
O' temporal things a keen partaker.
Noo, a' this leads up to my tale
O' what befell puir Tam Macphail,
A canny miner chiel in Fife,
Wha led a maist exemplar' life,
And ne'er abused himsel' wi' liquor,
But took it canny like and siccar.
Aye when he cast his wet pit-breeks
Tam had a gless that warm'd his cheeks,
For, as it trickled owre his craigie,
He held it warded aff lumbaigy;
It wisna that he *liked* the dram,
'Twas aye needcessity wi' Tam.
But twa year syne—or is it three?—
Tam thocht that he was gaun to dee;
And, Govy Ding! they've gar'd me grew
Wi' tellin' what I'll tell to you.
The early tatties had come in,
And Tammas's besettin' sin,
A love o' a' this warl's guid things,
And a' the pleesures eatin' brings,
Gar'd him hae sic a bad mischeef
It fleggit him ayont belief.

Pay-Saturday it was, I mind,
The mistress, meanin' to be kind,
Had biled the firstlin's o' her yaird
(For naethin' else Tam would hae sair'd).
Sae when they cam' frae Jean's clean pat,
Altho' they seemed a trifle wat,
Tam in his hunger ate a meal
That would hae staw'd the big black Deil;
Syne at his cutty had a draw,
Syne gantit wi' wide-open jaw,
And, ainee his heed was on the cod,
He sune was in the land o' Nod.
But when the knock had chappit four,
Tam had to rise and get attour;
For in his bed he couldna' bide,
He'd sic a steer in his inside.
The granes o'm wauken'd faithfu' Jean,
And then commenced a bonny scene.
A parritch poultice first she tried,
Het plates on plates she multiplied,
For men in sic-like situations,
Ye ken, hae gey sma' stock o' patience.
But fast the pain grows diabolic,
A reg'lar rivin', ragin' colic,
A loupin', gowpin', stoondin' pain
That gars the sweat hale doon like rain.
Whiles Tam gangs dancin' owre the flair,
Whiles cheeky-on intil a chair,
Whiles some sma' comfort he achieves
By brizzin' hard wi' baith his nieves.
In a' his fifty year o' life
Ne'er had he kent sic inward strife.
He couldna' sit, and yet forbye,
Like Washington, he couldna' lie.
Ilk' time wi' pain his frame was rackit
He buller'd like a man distrackit,
And sune, wi' roar succeedin' roar,
He fosh in a' the fowk neist door;
And ane o' them (auld Girsie Broon),
She ran and brocht the doctor doon,
Wha hurried in a' oot o' breath,
For Girsie said 'twas Life or Death.
The doctor oxter'd Tam till's bed,
Fingered his wame, and shook his head.
"Acute abdominal congestion,
Of that there's not the slightest question,

And, what my great experience teaches
Is, most relief is got from leeches.
See that he gets them; otherwise,
Don't blame me if the patient dies."
"Awa!" yells Tam, "fesh hauf a dizzen.
Oh! haste ye, or I loss my rizzon!"
Sae aff gangs wullin' Girsie Broon
To wauk the droggist wast the toon.
Noo Droggie had an awfu' stock:
Tobacco, wreetin-paper, rock,
A' kin' o' wersh tongue-twistin' drinks,
A' kin' o' Oriental stinks;
The best cod-liver ile emulsions,
And poothers that could cure convulsions;
Famed Peter Puffer's soothin' syrup,
And stuff to gar canaries chirrup;
He'd toothache tinctur's, cures for corns,
Pomade that mak's hair grow on horns;
He'd stuff for healin' beelin' lugs,
He'd stuff for suffocatin' bugs;
He'd stuff for feshin' up your denners
Against your wull and a' guid menners;
A' kin' o' queer cahoochy goods,
To suit the system's varyin' moods,
Wi' navvies' operatin' peels,
Sookers for bairns, and fishin' reels,
In fac'—but Losh! I'd better stop,
The mannie kep' a druggist's shop,
And, in his bauchles and his breeches,
Cam' grum'lin' doon to get the leeches;
While, a' but scunner'd wi' their squirmin',
Aff hirples Girsie wi' the vermin.
And noo, my billies, draw a veil
Till mornin's licht owre Tam Macphail,
Till aince again the doctor cam'
To see what cheenge was wrocht in Tam.
'Twas nine o'clock he stapt inbye,
Relieved to hear nae waesome cry.
"Well, well, Macphail," the doctor says,
"My treatment's worthy of all praise!
I left you—why, 'twas like a riot!
I see you now contented, quiet.
Far, very far, our knowledge reaches—
How did you get on with the leeches?"
Tam ne'er replied, but turn'd his back,
Wi' tearfu' een 'twas Jean wha spak:

"Eh, doctor! sic an awfu' cure
I ne'er saw gi'en to rich or poor!
For, when we saw the ugsome beasts,
It gar'd the herts rise in oor briests.
Tam, here, aye taks your word for law,
And swallied doon the first pair raw!
But hard altho' the puir sowl tried,
He had to hae the last four fried."
Although puir Tam looked rale no-weel,
The doctor turned him on his heel;
He couldna trust himsel to speak,
The tears were runnin' doon his cheek,
And a' that day was sair forfaughin',
Wi' tryin' to haud himsel frae laughin'.
Whate'er wi' Tam ye chance to crack on,
There's ae thing ye maun ne'er gang back on:
Freely he'll talk on politics,
The weather and its dirty tricks;
On wages and the price o' coal,
Or things conneckit wi' his soul;
On hoo the minister's a leear,
And medical advice owre dear;
But if the crack works roond to leeches,
Puir Tam lays doon his pipe, and retches!

DAVID RORIE.

CULTS, ABERDEEN.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

SURGERY

By JOHN SHAW M'LAREN, M.A., M.B., F.R.C.S.,
Formerly Assistant-Surgeon, Royal Infirmary, Edinburgh

PROSTATECTOMY

LARGELY through the brilliant work of Freyer during the last five years, Prostatectomy at the present moment holds a large share of the attention of surgeons in this country. In America the operation has been practised for a longer period, and as the *Annals of Surgery* for April is devoted to the subject, and Freyer has published an account of the last 60 of his 170 cases, the time is a suitable one for considering the subject in its relation to choice of method, the use of the catheter, and other points.

Anatomical Considerations.—In the journal mentioned, Watson and P. M. Pilcher have articles dealing with the Anatomy of the Prostate. Writers are agreed that the gland is surrounded by a fibro-muscular capsule, which is separated from the outer "sheath" by a more or less distinct interval; the more distinct the interval, the more easy the enucleation on that plane. When the hypertrophied gland bulges into the bladder, its capsule lies immediately under the vesical mucous membrane, the sheath there being absent. P. M. Pilcher, who has made an examination of various prostates removed in the operation of prostatectomy, states that the capsule is opened in the perineal operation, and enucleation is done *within it*, and that in the suprapubic operation enucleation is done outside the capsule, but *within the sheath*. As this latter method opens the plane in which the plexus of veins lies, he considers that hæmorrhage is more likely to occur in the suprapubic than in the perineal operation. In small dense prostates not only is the capsule very adherent to the gland, but the space between capsule and sheath may become obliterated. In such dense prostates (though the gland may be torn away in small fragments) *enucleation*, either inside capsule or sheath, may be impossible.

Freyer definitely states that, whereas in some cases the prostatic urethra is brought away, embedded in the enucleated gland, in others the urethra is left intact, traversing the empty space, the prostate having shelled out without opening the urethral canal. Fuller also states that there is no damage to "the structures composing the vesical neck." In this connection the anatomical description given by P. M. Pilcher, and supported by a camera lucida drawing from a section, is interesting. "The mucous membrane lining the prostatic urethra is intimately related to the gland itself, and can only be separated from it with difficulty." The epithelial layer lies directly on the "fibro-muscular layer, which is in no way differentiated from" the tissue composing "the bulk of the hypertrophied prostate." And Lewis Pilcher is of opinion that "the claims of many operators, who remove prostatic masses, guided by the sense of touch alone, that very limited injury of the urethra results from their manipulations, are not sustained by our knowledge of the anatomical conditions of the parts." The mucous membrane of the urethra lies on the stroma of the gland; "the sub-mucous and muscular coats belonging to the urethra in other parts of its course are here replaced by prostatic substance." Only delicate dissection can separate the urethral mucous membrane from the prostate. Pieces of the prostate "can be readily torn away, it is true; but the operator who thinks that in effecting this he

leaves the prostatic urethra intact, is probably mistaken." But the surgeons say they can, and do leave it intact. And it is notoriously difficult, as the logicians tell us, to "prove a negative."

Catheter *v.* Prostatectomy.—This question is discussed by Thorndike in a paper with the title, "Has the Catheter a place in the treatment of Chronic Prostatic Hypertrophy." His attitude is reflected in the following sentences, taken from that article: "It is certainly and happily true that radical operations upon the prostate are slowly shouldering the catheter and other methods of palliative treatment aside, and are giving them a smaller and smaller field of usefulness. But there are many cases unfit to endure the shock of such radical procedures; and there are others (is it heresy to say so?) which are better off with proper palliation than with a radical operation." His opinion is that old infirm patients in whom the symptoms have appeared gradually, and who consult the surgeon only very late, are unsuitable subjects for operation, and should be treated by the catheter; if at any time serious "catheter" symptoms arise, prostatectomy should be advised at once before further evil consequences follow. The reply might be made to this that operation should have been advised at first instead of the catheter, as the patient will now be still less fit for an operation than at the beginning of his troubles.

On the other hand, when the patients are younger and the amount of residual urine exceeds three or four ounces, what should be done? That depends, Thorndike holds, on their "social" condition. If ignorant and poor and surrounded by conditions making surgical cleanliness almost impossible, they should be advised that the risks of operation are less than those attending catheter life. On the other hand, there are patients who are intelligent and cleanly, and whose conditions of life are comfortable. "These are the cases over which most difference of opinion exists." The choice for them is between the risk of bladder and kidney infection on the one hand, and a formidable operation with "a 5 per cent. mortality" on the other. Thorndike advises such patients to enter on catheter life. Pilcher, on the contrary, considers that the risks attending the use of the catheter far outweigh those in connection with prostatectomy. "The particular indication for prostatectomy to-day, therefore, is a degree of urinary obstruction that interferes materially with comfort or entails notable disability, which examination demonstrates with reasonable certainty to be due to enlargement of the prostate or to fibrotic changes in its texture." And Watson Cheyne ("Manual of Surgical Treat-

ment") writes: "We have little doubt that enucleation is the method of choice in the treatment of enlarged prostate. When catheter life must otherwise be entered upon, it (enucleation) may well be urged if the patient be in a good condition to stand the operation, as he will thereby be relieved of the risks that must attend the habitual use of a catheter."

Preliminary Examination and Treatment.—On this point there is evidently a variety of opinion amongst operators. J. H. Cunningham strongly advises careful cystoscopy before the operation, to help in determining the method to be chosen; Pilcher writes that "whether cystoscopic examinations of the bladder shall be made or not will depend very much on the habit and personal prepossession of the surgeon," and himself deprecates the routine use of the cystoscope; while Wiener declares that he has "never made a cystoscopic examination in the presence of marked prostatic hypertrophy," and he hopes he never will. He avoids even passing a catheter before operation. Freyer seems to favour the use of the cystoscope in certain cases. Surgeons seem to differ, too, on the subject of preliminary treatment. Pilcher advises careful washing of the bladder and the administration of internal urinary antiseptics; while others make no mention of this, or urge that the bladder and urethra should, as far as possible, be rigidly left alone.

Choice of Method.—Pilcher mentions three methods: (1) Through the bladder, by suprapubic incision. (2) By the perineum through a limited longitudinal mesial incision carried into the capsule of the prostate—the "median lithotomy" incision. (3) By the perineum through a free transversely curved incision, through which the prostate is fully exposed, followed by systematic incision into its substance, and subsequent enucleations, largely under the guidance of the eye. It is not likely that the second method will gain in favour, for it shares with the suprapubic method the disadvantage that the enucleation requires to be carried out unaided by sight, while it has none of the advantages of that method; but it is advocated by Gouley and Watson of America, and was the method employed in many successful cases.

The main steps of the *suprapubic operation* are familiar to surgeons in this country. The bladder is opened suprapubically, its mucous membrane over the bulging prostate divided, and the prostate and its capsule shelled out from within the sheath in one or more pieces; sometimes, according to Freyer, it is possible to leave the urethra intact, the prostate splitting up in front of and behind that tube as it is enucleated. The operation

in Freyer's hands is often completed under ten minutes. The *perineal operation* can, according to most American authors, be satisfactorily performed only by the aid of a special instrument, a tractor, which brings the gland within reach of the enucleating finger. A curved or inverted V-shaped perineal incision is made through skin and fat, the bulb is pulled forward, the recto-urethralis muscle detached from the urethra, and the rectum drawn backwards. This fully exposes the prostate. The prostatic urethra is then incised; the tractor, introduced through the urethral wound, pushes the gland towards the surface, and the prostate is enucleated from within its capsule. The time occupied in the first part of the operation—the exposing of the prostate—is ten to twelve minutes (Pilcher).

Objections against the suprapubic method may be thus stated: (*a*) Visibility, (*b*) drainage, (*c*) hæmorrhage, (*d*) bladder opened, (*e*) mortality. (*a*) The advocates of the suprapubic operation must concede that in it the fingers have to work unaided by sight, while in the perineal operation surrounding structures, though little damaged in the process, are put aside, the capsule of the prostate is exposed, and structures such as the ejaculatory ducts may be saved. This last point is important, and under the perineal method, especially when incisions are directed so as to save the ducts, the results as regards sexual power surpass those seen in cases where attention to this point was not, or could not, be given. "There is surely nothing," writes Pilcher, an advocate of the perineal route, "in the special conditions of the prostate to take its surgery out of the application of that tenet of general surgery which demands the adequate exposure of the affected part as the first step of any attack upon it." While this must be allowed, it must, on the other hand, be admitted that the disadvantage of "working in the dark" in this special case is not a very serious one, and Pilcher himself, in describing the perineal operation, writes: "The finger-tip may now be substituted for the blunt dissector, as the enucleation extends into a region *beyond the control of the eye*" (italics not in original). So that here, too, the fingers may have to work without the aid of sight. (*b*) Drainage. Here again the perineal operation looks better "on paper," but in practice the drainage from a suprapubic wound always seems sufficiently free, and can be made complete by siphonage. (*c*) Hæmorrhage. If the enucleation be made in the perineal method within the capsule, then there is certainly less risk of wounding the prostatic plexus than in the suprapubic operation, for the plexus lies between capsule inside and sheath outside, the plane of the suprapubic enucleation. But though hæmorrhage in that method has often been reported as severe, seldom, if ever, does

it seem to have been beyond control or dangerous. (*d*) Bladder opened. Though this objection is urged against the suprapubic route, there is little to choose between the operations on this point, for the perineal operation makes a large wound in the urethra. (*e*) Mortality. Pilcher quotes certain recent statistics from American, Continental, and British surgeons, from which it would appear that the suprapubic operation in Freyer's hands has a mortality of over 5¾ per cent., while the various statistics of those who have performed a perineal operation average scarcely over 4 per cent. Should this higher death-rate continue to attend the suprapubic operation, it would perhaps be the most serious objection from which its advocates would be called upon to defend it. It will be evident from the above that the others are not such as to carry great weight.

On the other hand, objection to the perineal method may be taken on these points: (*a*) Special instruments, (*b*) possible injury to rectum, (*c*) operation in two steps, (*d*) time consumed in operating. (*a*) Special instruments. We have seen that some form of tractor is required in the perineal operation to bring the prostate within reach of the finger; but this is obviously no worthy objection. If the method be the better one, such a consideration sinks out of sight. (*b*) Possible injury to rectum. This obviously may occur in either operation in separating the prostate from the anterior rectal wall; but there seems to be an additional risk in the perineal operation during dissection, especially in the case of hard fibrotic prostates. It occurred twice in the hands of such a good surgeon as Pilcher. (*c*) Operation in two steps. This point introduces a more serious objection. A fairly large number of patients will appear for treatment whose condition is such that the surgeon will deem a prostatectomy advisable only after the bladder has been opened, drained, and irrigated. The suprapubic opening of the bladder is the better for this purpose, for one reason, that it will not involve wounding the part to be subsequently operated on. When such an opening has been made, the case "will naturally invite attack through the bladder," as otherwise insistence on the perineal method would involve a second deep wound. (*d*) Time consumed in operating. This is perhaps the most serious objection to the perineal method when compared with the other. Pilcher states that the dissection necessary to expose the prostate before the tractor is introduced and the enucleation commenced requires little time, but he puts it at ten to twelve minutes. Now, in Freyer's last series most of the "times" *for the whole operation* given are three to eight minutes, with one exception, which is twenty-six minutes—a very difficult case; and in Wiener's hands the whole operation (suprapubic)

required from five to nineteen minutes, average ten minutes. Considering the class of patient operated on, this is no unimportant consideration; and in this connection Wiener has written an interesting paper, in which he states that he has performed suprapubic prostatectomy on eleven patients without ether or chloroform, using nitrous oxide to produce anæsthesia. In one case "a small, hard, adherent prostate was removed with some difficulty in nine minutes," a small piece of the urethra coming away with it. In two cases the patient was over seventy-five years of age, the one in a wretched condition with chronic cystitis and daily rigors, and the other the subject of acute retention, the bladder full of urine and blood-clots. In both the bladder was opened suprapubically, and treated for ten or eleven days; at the end of that time the prostate was removed under nitrous oxide anæsthesia through the suprapubic wound.

The objections, then, to the suprapubic operation are slight, while the points in its favour are considerable. The operation seems to be a simpler, easier one than the perineal, requiring less dissection and less time for its performance, and were it not for the fact that as yet it seems to have been attended by a higher mortality, it would decidedly be the preferable operation, and probably in the near future will prove so. But it must be remembered that, though each has its advocates, the one operation may not be the better one for every case; Watson and Fuller, for example, evidently consider that the suprapubic is better for some cases, the perineal for others. On the whole, the suprapubic seems destined to prove superior.

DISEASES OF CHILDREN

By W. B. DRUMMOND, M.B., C.M., F.R.C.P.,
Assistant-Physician, Royal Hospital for Sick Children, Edinburgh

Gonococcus Infections in Children.—It is a well-established fact that most of the forms of gonococcal infection which are met with in adults may also occur in young children. In most of the severe cases of ophthalmia neonatorum the organism present is the gonococcus—infection usually occurring during labour from the secretions of the mother. The newly-born may also suffer, as has been shown by Dohrn and Rosinski, from a form of stomatitis due to gonorrhœal infection. In children a little older, vaginitis and urethritis are frequently due to infection by the gonococcus, and it is chiefly in these cases that we meet with such complications as bubo and arthritis.

Although these facts are now generally recognised, comparatively few physicians yet realise how very intractable cases of gonococcal infection in young children frequently are, nor how great is the danger of contagion in institutions. A very important paper on this subject has recently been published in the *New York Medical Journal* (March 18 and 25), by Professor L. Emmett Holt, whose experience physicians in this country will regard as peculiarly unfortunate.

The term gonococcus infection is adopted by Professor Holt on the ground that the commonly-used terms gonorrhœal ophthalmia, vaginitis, and arthritis suggest a venereal origin, which is seldom the case, and we agree with him that the old term might be dropped with advantage.

Professor Holt records in detail his experience with gonococcus infections in the Babies' Hospital during the past eleven years. The most important points may be summarised:—

1894.—Seven cases of vaginitis admitted; 4 of ophthalmia. No bacteriological examination. No cases of infection.

1895.—Six cases of vaginitis, 7 of ophthalmia admitted; 2 cases of vaginitis acquired in the hospital.

1896.—No gonococcal infections admitted during the first eight months; then 4 of vaginitis and 2 of ophthalmia admitted; 2 cases of vaginitis and 1 of arthritis developed in the hospital. Bacteriological examinations of the discharges confirmed the diagnosis.

1897.—Eleven cases of vaginitis and 6 of ophthalmia admitted; 5 cases of vaginitis and 1 of ophthalmia developed in the hospital—the latter in a child who had also gonococcal vaginitis.

1898.—Five cases of vaginitis and 12 of ophthalmia admitted; 5 cases of vaginitis developed in the hospital.

1899.—First epidemic experienced. In the first five months 5 cases are recorded. In the beginning of June, 3 children were admitted from the same day-nursery and transferred to the country branch before it was discovered that they had vaginitis. Eight other children admitted were found to have the disease, and from these 15 girls contracted the infection, being practically all the inmates of one of the cottages. In spite of separate nurses for the infected cases and boiling and disinfection of the napkins, every girl placed in the infected cottage—which was a dormitory for the larger children—contracted vaginitis. At the end of the season, disinfection of clothing, wards, etc., was carried out as thoroughly as after scarlet fever.

1900.—For the rest of 1899 and the whole of 1900 (sixteen months), 10 cases are recorded—4 admissions and 6 infections.

1901.—Almost a repetition of 1899. Total cases, 47, there being admitted 16 cases of vaginitis and 6 of ophthalmia, while 22 cases of vaginitis and 3 of ophthalmia developed in the wards. When the epidemic was at its height in the summer, no amount of napkin disinfection had any effect in checking it.

1902.—More stringent regulations were adopted regarding the admission of children, especially to the country branch, yet 6 children with vaginitis were unintentionally admitted during the summer, and although these were quarantined as soon as they were discovered, 11 secondary cases occurred. A new phase of the disease was the development in the wards of 3 cases of gonococcal arthritis, one in a male infant of 2½ months, and one in a female without vaginitis. None of these children had ophthalmia. In all three the diagnosis was confirmed bacteriologically.

Experience in New Hospital.—In November 1902 the new buildings of the Babies' Hospital were opened. A child suffering from gonococcal vaginitis—an intractable case during the previous summer—was readmitted. No fresh cases of vaginitis were admitted, and only one of ophthalmia; yet during the next few weeks 11 cases developed, including 3 of arthritis, all in boys under 2½ months old. Every precaution that could be thought of was taken, yet the infection continued to spread. During the first six months the hospital was opened, from 5 cases admitted there developed 29 cases of vaginitis and 8 cases of arthritis; one case of ophthalmia was admitted, none acquired.

1903.—Ten cases of vaginitis admitted, 55 acquired; 1 case of ophthalmia admitted, 1 acquired; 2 cases of arthritis admitted, 10 acquired. Many of the cases of vaginitis were very mild and would not have been recognised had not routine bacteriological examinations been carried out.

1904.—Fatal cases 52, of which 16 were vaginitis. No female child was admitted without a microscopical examination being made of the vaginal secretion, and infected children were refused admission unless in urgent need of hospital treatment, in which case they were received and placed in quarantine.

Professor Holt does not regard his experience as exceptional, but on the contrary believes that there has not been more vaginitis in the Babies' Hospital than in other institutions for children. This opinion is in part based upon the results of an investigation made by Dr Dorothy Reed, and Miss Wheeler, the superintendent of the Babies' Hospital. Included in this investigation were:—

1. An institution receiving infants and young children.

Smears were made from the vaginal secretion of 100 infants and young children. There was no selection of cases. Results—pus and gonococci in 12 cases; pus and no gonococci in 20 cases.

2. An institution receiving infants and young children. Smears examined from 56 cases; pus and gonococci in 6; pus and no gonococci in 13. The latter regarded as suspicious. The superintendent regretted that she did not know the time of the intended visit that the children might have been previously bathed.

3. A home for children of two to ten years. Cases examined 77; pus and gonococci 2; pus and no gonococci 10. An exceptionally clean house.

In discussing the clinical manifestations of the affection, Professor Holt states that in his experience the majority even of mild cases of *vaginitis* are gonococcal in origin. Cases in which few organisms are detected in the discharge usually turn out to be gonococcal, while if there are many varieties of organisms present, the case will seldom be one of gonococcal vaginitis. In most cases the gonococcus is present in large numbers. The most troublesome feature of gonococcal vaginitis is not its severity but its intractibility.

Cases of *ophthalmia*, Professor Holt thinks, should not be admitted to children's hospitals, but to special hospitals for diseases of the eye.

The section dealing with *arthritis* is one of the most interesting parts of the paper. No less than 26 cases of this kind were treated, and of these 19 were male children and 7 were girls. Four of the girls suffered from vaginitis, while in only 1 of the boys was there other clinical evidence of gonococcus infection, this patient having also ophthalmia.

Sixteen of these joint patients were 16 months or under, 2 of them being under 1 month.

A single joint was involved in only 5 cases, and the largest number of joints involved in any one case was 8. The joints most frequently affected were, in order, the fingers or metacarpals, the ankles, the knees, the wrists, the toes or metatarsals. The diagnosis was confirmed in all cases by bacteriological examination.

The general symptoms were of a pyæmic character, with fever, wasting, prostration, and exhaustion. Fourteen of the children died. Of the others, there was complete recovery in many, slight stiffness in a small number, and marked fibrous ankylosis in only one or two. In none was bony ankylosis seen. Early incision and washing out usually sufficed for a rapid cure, and in some incision only was practised and joints

were healed inside a week. Prolonged discharge with the formation of sinuses was not seen.

With regard to the spread of the disease, Professor Holt brings forward evidence to show that the infection is carried by the nurses in the process of bathing and feeding, and especially in changing the napkins. In a few cases the infection may have been carried by the nurse's finger used in cleaning the mouth of babies suffering from thrush. Auto-infections, such as ophthalmia from vaginitis, were very rare.

As to prophylaxis, two things are essential: First, cases of gonococcus vaginitis must be excluded so far as possible. In the second place, if admitted by accident or otherwise they must be quarantined. In excluding cases only one thing can be relied upon, namely, microscopical examination of a smear from the vaginal secretion before the child is admitted. This rule has been followed in the Babies' Hospital for nearly a year with the effect of practically overcoming the difficulty, but the additional precaution is taken of examining microscopically once a week a smear from the vaginal discharge of every girl in the house.

If children are isolated the quarantine should extend to the nurses and attendants, and must continue for two or three weeks after all inflammation has subsided and the organism has ceased to be found in the secretion. Napkins, towels, sheets, and clothing must be disinfected, and washed separately from that of the rest of the house.

DERMATOLOGY

By F. GARDINER, M.D., F.R.C.S.,
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SERUM THERAPY IN DERMATOLOGY.

THE micro-organismal origin of various skin diseases, although now established in many cases, is still a subject of dispute. From the time of Unna's discovery of a micrococcus which he considered to be pathogenic in seborrhœic eczema, through the period of Sabouraud's endeavour to prove his micro-bacillus to be the causative agent in alopecia areata, till to-day, the literary warfare has raged and there is no prospect of an armistice.

Even the most doughty exponents of the nervous and other anti-microbe theories admit the presence of germ life in many skin eruptions, but the onus of proving that these germs are the

fontes et origines mali, is heavy and at present often not feasible. Veiel (1), finding staphylococci present in all cases of chronic eczema, considers that, in finding that they differ from saprophytes by producing hæmolytic ferments and giving an agglutinative reaction, he has proved their pathogenicity, but we believe this proof will not satisfy many observers.

Gilchrist's discovery of the regular occurrence of a pus-producing bacillus in acne has been followed by the statement that the accompanying anæmia and debility are due to a toxæmia from this local infection. As against this theory we would point out that anæmia often precedes the acne; and further, that in many cases of pulmonary tuberculosis we have seen most aggravated acne; these occurring on the contrary not among the most anæmic of individuals, but very often in patients recovering from their pulmonary condition.

If, however, some skin eruptions are due to microbes and a general toxæmia is present, then the prospect of serum-therapy for such is hopeful, and so far the results have shown distinct promise. Wright (2) has done much scientific research in this direction. To use his own words, "in fighting against a bacterial disease there are only two methods, either antiseptics or dependence on protective agents elaborated by the organism for destruction of the bacteria"; and again, "If we take a normal man and one affected with tubercle or staphylococcal infection, we find that the protective substances are less in the affected patient."

His method consists in the inoculation of dead cultures of bacteria, the immediate result being a negative phase in which the protective substances are less and the immunisation is under the influence of stimulation. In other words, the negative phase is due to the poisons introduced using up all the protective substances in the system and the cells are incited to fresh production.

His vaccine is made by keeping cultures at 60°, as at this heat the chemical properties of the bacteria are not altered, while as an extra safeguard a small quantity of carbolic acid is added. A single volume of blood is mixed with an equal volume of the culture, and then under the microscope, by means of a hæmocytometer, the proportion of blood corpuscles to germs can be counted. Thus knowing how many corpuscles are in 1 c.c. of blood, it can be calculated how many bacteria are in 1 c.c. of serum. When organisms are injected into the blood, opsonins are developed. These substances which are found in the serum only paralyse the bacteria and render them more suitable pabulum for the leucocytes.

To estimate the "phagocytic index," and so calculate the

strength of these opsonins, normal blood and bacteria are again mixed, and by means of the microscope the average number of bacteria absorbed by each leucocyte is obtained. This number is greater in the normal blood than in that of a diseased person. With these measurements to start with, he recommends that "one should inoculate a dose of vaccine so small as to get a very transient negative phase."

In staphylococcal infection this negative phase should last only one day at the most and be succeeded by a positive phase which is not permanent and dies down somewhat. The injection should again be repeated, but there is danger in plying the stimulus too often as a deep negative phase is apt to follow.

From the above facts it will be seen that endeavours should be made to produce a gradually ascending curve to the highest level. The difficulty is to find the exact point at which the positive phase is passing off, as then is the time for reinjection.

One case of furunculosis did not improve, a result which he attributes to the patient having little power of producing protective substances, but short of that he states: "Every patient I have inoculated for boils has got well promptly. Some have had relapses five months afterwards, but every patient who has had acne and been inoculated has got distinctly better."

Acne, furunculosis, and sycosis are all treated with staphylococcal vaccines, and as we have mentioned the results, encouraging though they are, will require time to establish their permanency.

It is not surprising to hear that comedones remain after the pustules in acne are removed, as these are now generally held to be caused by the acne-bacillus, whilst the pustules are due to mixed infection from staphylococci.

On some occasions Wright has used cultures made from the patient himself, and, at least in all doubtful cases, it would be more scientifically accurate to do this rather than use a mixture of staphyl. albus, aureus, and citreus as he does. Streptococcal infections have not, so far, been treated in this manner. There will always be a place for local remedies, but where these fail, or when the condition is wider spread, serum therapy will be called upon.

Graham Little (3) has recorded a case of stubborn sycosis in a man of 40, which was treated with staphylococcal vaccine and in which cure followed.

In tuberculosis, Wright finds that the blood contains opsonins, and he has treated some cases with a vaccine composed of dead tubercle bacilli similar to the above, and benefit has resulted, although no absolute cures of tuberculosis of the skin are recorded. Graham Little has given the following history of a case treated

with T. R. tuberculin. A woman of 31 had suffered from enlarged glands of neck and sinuses when 14, and subsequently the skin of the neck was scraped, and the phalanges of the little finger removed. Three years later she was treated with 150 injections of old tuberculin; lost weight, became worse, and finally developed pneumonia. Finsen Light, X-Rays, and other treatment were adopted till December 1903, when T. R. tuberculin was used, six injections in two months being given at intervals of about ten days. The report then was that she had put on weight, the patches of lupus had improved enormously, the sinuses had practically dried up, and the patient felt generally better.

It is interesting to compare this with Low's (4) cases recorded in the May number, where he gives instances of good results from the old tuberculin, and states that at Breslau, T. R. tuberculin has not been found so reliable as the old preparation.

M'Call Anderson (5), in a recent lecture, mentions that he has used the old tuberculin continuously since its discovery, had met with no untoward results, and that most cases benefited, whilst many were cured. Further, its use has revealed unsuspected foci of pulmonary tubercle and benefited these. $\frac{1}{4}$ to $\frac{1}{2}$ c.c. of 1 in 1000 solution is the first dose, but this is gradually increased according to the reaction, until even 1 c.c. of pure tuberculin is given every third or fourth day. In some cases the treatment extends over many months.

Thus we have records—each so far successful—of treatment by three forms of tuberculin:—

1. Old tuberculin made by evaporating a bouillon culture to $\frac{1}{10}$th of its bulk, and exposing for an hour at a temperature of 100° C.

2. T. R. tuberculin, made by triturating dried cultures of bacilli in an agate mortar, adding distilled water and centrifugalising. The sediment is again subjected to the same process until no tubercle is found in it. Then 20 per cent. of glycerine is added, and a mixture made so that 1 c.c. contains 10 mg. of the dry substance.

3. Wright's vaccine made by keeping cultures at 60° for some hours.

Evidently all are very similar, containing as they do the bodies of dead bacilli, and if the dosage could be made accurate the results should be also similar.

T. R. tuberculin may contain less of the toxines, but, according to Wright, it contains live bacilli at times; if so, it is not made as Koch directed. To sum up, if the bodies of the bacilli are all that is necessary, Wright's method of counting the bacilli lends itself to greater accuracy, and if the phagocytic index

is a truer test than general reaction, the haphazard method of heretofore will soon be a thing of the past.

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1. *Münch. med. Woch.*, Jan. 6, 1904.
2. *Brit. Journ. of Dermat.*, Aug. 1904.
3. *Ibid.*, Sept. 1904.
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5. *Dermat. Society of Great Britain and Ireland*, May 24, 1905.

New Books and New Editions

Chapters in Pathology. Being an Outline of Lectures upon some Points in the Pathology of Elementary Nutritive and Circulatory Derangements. By W. S. GREENFIELD, M.D., F.R.C.P. (Lond. and Edin.), Professor of Pathology in the University of Edinburgh; and GEORGE LYON, M.D., M.R.C.P. (Edin.), Second Assistant in the Department of Pathology in the University of Edinburgh, and Assistant Pathologist to the Edinburgh Royal Infirmary. Pp. 113. Edinburgh: William Green & Sons. 1905. Price 5s. net.

THE main purpose of these Outlines is to provide students in Professor Greenfield's class with an epitome of his lectures on some elementary subjects in general pathology. Dr Lyon has prepared a digest of the lectures, and this has been revised, condensed, or in parts re-written, by Professor Greenfield. The result can be most heartily recommended to all students of pathology as an excellent and admirably expressed summary of our knowledge of the subjects dealt with. Definite statements of ascertained facts regarding complex processes, physiological and pathological, are often culled with difficulty by students in the course of their ordinary reading. The facts may be there, but the student has neither time nor, perchance, the necessary capacity to disentangle them from their theoretical or speculative surroundings. Not infrequently also he is not in a position to balance evidence, or even to appreciate the significance of particular experimental enquiries. To all such this booklet will prove of material assistance, as the teaching is sound and up-to-date, and bears the impress of one who has long thought, wrought, and taught.

After an introductory chapter on Elementary Cell Changes in Relation to Disease, Interference with Normal Cell-life is dealt with in three succeeding chapters. What is known with regard to the various degenerative changes is clearly outlined, and we feel sure many a student will be enabled to free himself from much perplexity by a careful perusal of this section of the work.

Circulatory Derangements in Relation to Nutrition are next reviewed. Under this heading we would draw especial attention to the chapters on Thrombosis and Embolism. The description of the events following arterial obstruction, their sequence, and the nature of the changes found, is based on the author's repeated observations.

The concluding chapters deal with Inflammation. We had hoped that the writer might have sketched out some more satisfactory method of dealing with this subject — a well-known stumbling-block to students and teachers alike—but he has elected to follow on the usual lines. He has succeeded, however, in presenting one of the most concise and intelligible reviews of the ascertained facts with which we are acquainted, and has taken full cognisance of the results of the more recent experimental researches on the subject.

We trust that this volume will be succeeded by another dealing with the important subject of New Formations.

Reports from the Laboratory of the Royal College of Surgeons, Edinburgh. Edited by Sir JOHN BATTY TUKE, M.D., and D. NOËL PATON, M.D. Vol. ix. Edinburgh: Oliver & Boyd. 1905.

THIS is a valuable addition to an admirable series, and contains a record of the work done in the Laboratory since 1902.

As all the reprinted papers have already been favourably reviewed in other scientific journals, it is not necessary here to notice them in any detail. The present volume, however, has a special value, and will doubtless be constantly referred to, as it contains, in a series of fourteen papers, the record of the researches which have been in progress for the last three years on the "Physiology and Pathology of the Ductless Glands." The expenses of these investigations, it will be remembered, were defrayed by the generosity of Mr Francis Mason, and Dr Noël Paton and his collaborators are to be heartily congratulated on the results of their painstaking and enlightening labours.

In addition to the above, several physiological papers by Dr Noël Paton and Dr Dunlop will be read with interest; while in the pathological section, special attention may be directed to Dr Harry Rainy's paper on "The Pathology of Friedreich's Ataxia"; to Dr Ritchie's paper, "On the Etiology of Fibrinous Bronchitis"; and to "A Contribution to the Study of Mastitis in Cows," by Mr James Henderson, M.R.C.V.S.E. The volume concludes with a reprint of Dr C. J. Lewis' Parkin Prize essay, "On the Curative Effects of Carbonic Acid Gas, or other forms of Carbon, in Cholera, for different forms of Fever and other Diseases," and with a short paper, "On Hand Disinfection," by Dr Robert Purves.

Carcinoma of the Rectum: its Diagnosis and Treatment. By F. SWINFORD EDWARDS, F.R.C.S., Senior Surgeon to St Mark's and St Peter's Hospitals, etc. Pp. 47. London: Baillière, Tindall & Cox. 1905.

THIS little book is valuable as a record of the experience and results obtained during a period extending over more than 12½ years, and including 40 cases operated on.

Mr Edwards strongly advocates a preliminary colotomy 14 days before the major operation in every case in which extirpation of the rectal disease is decided upon. The colotomy he performs by a somewhat novel but good and simple method. Excision he performs by a modification of Kraske's method. He employs a mesial incision through the skin—always removes the coccyx—usually part of the sacrum also. He does not, however, state how much of this bone he removes or considers it safe to remove. There are some details in regard to diagnosis that might have been more fully stated. He does not draw sufficient distinction between the rectum, anus, and anal canal. Again, the lymphatics and glands liable to be affected secondarily are not sufficiently defined.

The results obtained by Mr Edwards have been very satisfactory. The death-rate, in 40 unselected cases, being only 7.5 per cent. Recurrence is known to have taken place in 14 cases, in one after an interval of 8 years. Thirteen patients are known to be in good health—one 10 years after operation.

Mr Edwards has excluded all cases operated on within the last 18 months, and also all cases in which removal was not possible.

Diseases of the Anus and Rectum. By D. H. GOODSALL, F.R.C.S., and W. ERNEST MILES, F.R.C.S. In two Parts (illustrated). Part II. First edition. Pp. 271. Longmans, Green & Co. 1905. Price 6s. net.

PART II. treats of prolapse of the rectum, ulceration, stricture, malignant disease, tumours, foreign bodies, pruritus, and syphilis.

This part of Messrs Goodsall and Miles' work is well written, carefully and thoroughly detailed, and admirably illustrated.

The symptoms of all the conditions treated of are fully and accurately recorded. Operations are described with thorough detail. The experience of the surgeons is also given faithfully. The work is consequently valuable as a reference, not only for surgeons, but for practitioners. In the chapter on prolapse, the authors draw a distinction between prolapse, procidentia, and invagination. The treatment recommended is good and trustworthy. Ulceration is fully described, and most space is given to an account of what the authors call "infective ulcer," which seems to be prevalent in certain hospitals, occurring after operations, especially for piles. It is confined to the mucous membrane, is very liable to spread and to recur, and is very difficult to treat. It is supposed by the authors to have been introduced from the East. Special examinations and reports have been made by Dr Klein and Professor Woodhead, but no new bacillus has been found. The most successful treatment has been by escharotics—especially nitrate of silver. Stricture not unfrequently results, for which the best treatment is cæcostomy—because the sigmoid is frequently involved in the contraction.

The chapter on Stricture is full of practical suggestions, especially in regard to examination of the patient. It is, however, mainly in the chapter on Malignant Disease that the authors give the profession the benefit of their experience. In regard to symptoms, they consider that constipation is the earliest, then "diarrhœa," and that alternating constipation and diarrhœa does not occur till a late stage of the disease, when complete obstruction is imminent. In preparing the patient for operation, they advise that purgatives should not be given, as they may cause rupture above the stricture. The different stages of the disease are described very graphically and with great accuracy of detail.

The operation preferred by Messrs Goodsall and Miles is free removal of the rectum and anal canal. "No attempt should be made to preserve the sphincters. The circum-anal skin should be widely removed, because recurrence so frequently first shows itself in the subcutaneous lymphatic plexus surrounding

the anus, especially when the growth is situated low down in the rectum." A permanent artificial anus is formed in the left or right iliac fossa. An anus is also left in the sacral region. When possible, the greater part of the excision wound is closed with buried sutures. The details of the whole operation are carefully recorded.

The authors do not give any statistics or records of cases. They say, however, that their mortality after operation in 37 cases has been "less than three per centum" since adopting iliac colostomy as a rule, three or four weeks before excision, and removing the rectal tumour from above downwards—a procedure which diminishes the risk of hæmorrhage greatly.

One of the most valuable contributions of the authors to the literature of this subject is a statement as to the situations in which recurrence has been noticed. These are "the peri-anal skin, the portion of the bowel immediately above the point of section, the presacral lymphatic glands, the pelvic lymphatic glands, neighbouring viscera, and the levator ani muscles." They honestly state that recurrence is "the rule rather than the exception." This points to earlier operation, if possible, and freer removal—if removal is to be attempted at all.

This chapter is closed with an account of colostomy, which, it is recommended, should be performed as soon as possible, in every case of malignant disease of the rectum, whether operable or inoperable.

The sixth chapter is devoted to a description of Simple Tumours of the Rectum, their diagnosis and treatment. Numerous photographs illustrate this chapter.

Chapter seven deals with Foreign Bodies. The histories of 23 cases are given, and a photo of the foreign body removed from each.

A short chapter is devoted to Pruritus Ani, and the last to Syphilis.

Dental Surgery for Medical Practitioners and Students of Medicine. By A. W. BARRETT, M.B. (Lond.), M.R.C.S., L.D.S.E., Consulting Dental Surgeon to the London Hospital, and late Lecturer on Dental Surgery in the Medical School; Examiner in Dental Surgery to the Royal College of Surgeons, England. Fourth Edition. Pp. xiii. + 156, with illustrations. London: H. K. Lewis. 1905.

NO dental surgeon who is constantly brought in contact with medical men, whether in private or in hospital practice, will for a moment question the statement that there is need for a small

manual from which the medical practitioner may cull a general idea of the ideals and practice of modern dentistry, and particularly find concise directions for applying first-aid to people in pain from causes dependent upon a diseased condition of the teeth and tissues of the mouth, whilst an account of the principles of modern dental hygiene and prophylaxis would be of great interest and value.

Probably no branch of the healing art has become so specialised as that dealing with the teeth; and owing to the phenomenal progress it is making, requiring increased special knowledge, larger number and complexity of instruments, and above all, a high degree of manipulative ability to afford even moderate success in the operations performed, it is no wonder that the practice of this speciality is almost completely ignored by the already overburdened practitioner. During the last decade the causal relationship between diseases of the teeth and many diseases of other parts both general and local has been abundantly proven, and the interest of medical men has been aroused and turned towards pathological conditions of the buccal cavity.

The great difficulty then arises as to what of dentistry should and what should not be included in a manual primarily intended for the enlightenment of the medico, and here naturally there will be great difference of opinion.

So far as we are aware, the only work in English that attempts the task outlined is the one under review, and we regretfully believe that the fact that it has now reached a fourth edition must be ascribed not so much to any virtues it may possess, as to the fact that the medical practitioner must be content with this or none. In casually turning over the leaves, the most noticeable feature is naturally the illustrations; and considering that the interpretation of some of them has puzzled many a dentist, it is not difficult to infer the value they will have to one who is presumably quite ignorant of the subject. Not only are they no credit to an author and publisher in this twentieth century, but the objects intended to be represented are far more typical of dentistry as it was thirty years ago than as it is to-day. The disappointment engendered by the illustrations is not allayed by a careful reading of the book. The author has, as has been admitted, undertaken a difficult task, and great latitude must be allowed for differences of opinion on debatable matters, but there is no excuse for the inclusion of so much that is antiquated, and the exclusion of almost all that is modern, and we trust that no reader will run away with the notion that the book in any sense represents either the science or art of dentistry as it is to-day.

The chapter on Anæsthetics in Dental Surgery is characteristic of the book, but the matter is one of such importance considering the number of deaths that occur under chloroform for simple dental operations that one cannot but feel amazed that any teacher should even mention this drug as an anæsthetic in dental surgery. We trust the fifth edition will be a new book, re-written from cover to cover, and illustrated in a manner worthy of the subject and of the times.

Notes on How to Rear an Infant. By GEO. BRIDGEFORD PROCTOR, L.R.C.P.E., L.R.C.S.E., L.M., L.F.P.&S.G. London: S. Rentell & Co., Ltd. Price 6d.

THIS is a chatty little pamphlet for mothers. The following extracts will give some notion of its contents, and of the way in which the information is presented.

"If mothers read this carefully, and pay attention to a few simple rules, they would finally be rewarded with success, their night's rest would be peaceful—which alone is a consideration—and they would be helping nature, save themselves much anxiety, endless worry, and, important to note, lessen the doctor's bill, which, when it has to be met, irritates many a fond parent. Do not allow your name to be classed in such a category, but superintend personally throughout, carefully giving instructions to the nurse in charge, and your efforts will be rewarded by health for the child.

"These remarks apply to rich and poor alike.

"Lose no time, but 'read, mark, learn, and inwardly digest the same.'"

The beauty, as well as the health of the infant is to be looked after, as the following paragraphs show.

"The shape of the nose may also be improved by gentle manipulation daily, and the cartilage, bones, and skin will in due time mould themselves to your wishes, and so assist to remedy nature's faults.

"You may be called fussy, nevertheless do it. Improvement will be the reward."

All Communications—including **BOOKS** *for* **REVIEW** *and* **EXCHANGE JOURNALS**—*are to be addressed to* THE EDITORS, 7 *Manor Place, Edinburgh*, AND NOT TO 43 CASTLE STREET.

THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

ON THE URINE SEPARATOR OF LUYS[1]

By F. M. CAIRD, F.R.C.S.,
Surgeon to the Royal Infirmary

THE urine separator of Luys is already so well known that an apology is due to this Society for introducing some personal experience in the use of the instrument. But some excuse may be found in urging a more extensive application of an apparatus so remarkable for its simplicity and practical value.

Amongst the numerous articles which have appeared on the subject, we are specially indebted for the main part of this communication to Luys' own work ("La séparateur de l'urine des deux Reins") which was published last year, and also to a valuable paper by Suter ("Ueber der Harnscheidung von Indigo-Karmin durch die Nieren") which appeared in the *Correspondenz-Blatt für schweizer Aerzte*, for September 1904.

Luys' instrument has the shape of the old-fashioned French Béniqué bougie, which was distinguished by its sickle-shaped terminal curve. It consists of a central stem, to the concavity of which a chain is applied, worked by a screw in the handle. Over this rod and chain a tubular rubber cover is slipped after having been well lubricated with powdered talc. On rotating the screw handle the chain is tightened and the stretched cover rises as a membranous diaphragm on the sickle-shaped curve. To each side of the stem a catheter is applied, flattened on its inner side so that it may lie close to the central stem. The catheters are fixed into sockets in the handle and their freely perforated extremities are secured to each other, and the central stem by a rounded cap with a common screw. Thus the mounted instrument presents a rounded contour equal in

[1] Read before the Medico-Chirurgical Society of Edinburgh.

section to a No. 15 cylindrical bougie. The outer extremities of the catheters move outwards and downwards from below the level of the handle, where a carrier bearing a couple of test-tubes may be introduced to receive the urine from each.

It is essential to select a well-made instrument. The component stem and catheters should lie closely parallel to each other, so that a uniformly smooth rounded surface is presented throughout.

According to the instructions of the inventor, the instrument should be sterilised immediately before use by plunging it into boiling water for five minutes. If soda be added the rubber is damaged. The patient is laid horizontal and the urine is drawn off with a soft rubber catheter, observing the usual antiseptic precautions common to the passage of internal instruments. The bladder is now to be washed out with warm sterile boric lotion till it returns clear, care being taken that no air is allowed to enter. Thirty to forty grammes of the boric lotion are left in the bladder. The sterilised separator is now introduced after a copious lubrication. Luys recommends the formula of Oscar Krauss—

Gum tragacanth	2.50
Glycerine	10
Aqueous solution of phenol, 3 per cent.	90

The passage of the instrument gives little pain or difficulty in the case of women. If there be the least resistance, Luys directs that the separator should be withdrawn and the urethra gently dilated with Hegar's bougies Nos. 5, 6, 7, or 8. In the male, the procedure resembles the introduction of the lithotrite and may cause some pain. The beak should enter the membranous urethra before the handle is depressed, and care must be taken in every case that the instrument is completely within the bladder. A finger in the rectum or vagina may be helpful. It is well to ascertain the capacity of the male urethra and dilate if required. Extreme gentleness should be the rule, as in all cases of instrumentation, and pathological conditions may frustrate the passage.

As a rule the instrument generally glides in easily enough, and the contained fluid escapes by the catheters. The patient is next to be raised into a sitting posture on the edge of the

table with the thighs separated and the feet and back supported. The diaphragm may now be raised, a painless procedure, and the contracting bladder grasping the instrument; the central partition thus produced accurately divides the bladder in the mesial plane, and the secretion from each ureter flows into its separate half of the bladder and escapes by its respective catheter. The whole instrument is held steadily in the middle line, in a horizontal position, the carrier and tubes are slipped into position and the urine is collected.

In the event of hæmorrhage, say from a tender prostate, the clots may be washed out from each catheter alternately till the return flow is clear.

When the amount of urine necessary for examination has been obtained, the diaphragm is lowered by reversing the screw, the instrument is withdrawn, and the patient's bladder having been washed out anew with boric lotion, he is sent to bed.

The separator should now be dismounted, the catheters are to be flushed and cleansed with a suitable antiseptic. The whole instrument should be once more sterilised, dried, and returned to its box, minus the rubber cover. The covers may be used four or five times and should be kept in powdered talc.

Suter refers in his paper to the use of colouring matters as an aid to the investigation of the functional activity of the kidneys, and gives references to the literature of the subject.

He regards the methods of Voelker and Joseph as the best, and accordingly recommends the intramuscular (gluteal) injection of 4 c.c. of a 4 per cent. solution of indigo carmine. This pigment possesses the great merit over methylene blue of being shed unaltered in hue. In normal conditions of the kidney the colour appears in the urine in about ten minutes, attains its maximum in thirty minutes, and gradually ceases in two or three hours. Suter believes that we gain from this, evidence of the reliability of the separator, and valuable conclusions as to the functioning power of the kidneys.

The following cases examined since September 1904 serve to illustrate the above statements. Salient points are briefly noted. The Plate shows the colour of the urine and the quantities. Each couple of tubes represents ten minutes' collection, and the total amount was used for examination. In no instance did the patients experience local or constitutional disturbance.

CASE I. Mrs A., aged 60, a well-nourished lady, for a year past has been languid, suffering from right lumbar pain, and some frequency of micturition. There is a tender palpable swelling, something like the gall-bladder, in the lumbar region. The urine contains pus, and evidence of tubercle bacilli :—

R. Kidney—	L. Kidney—
10 c.c.	21 c.c.
Pale blue.	Dark blue.
Urea, 7½ gr.	Urea, 8 gr.
Tub. bacilli.	None.

The right kidney was accordingly removed. It was a typical example of caseating tuberculosis. The patient made a good recovery, and has gained in strength and weight.

CASE II. Mr W. I., aged 31, a spare man, complains of right lumbar pain, turbidity of urine, and, latterly, frequency of micturition. His ailment dates from a wetting which he received in August 1904, about three months ago. The family history is good, the habits are regular. The patient has lost 2 stones in weight since his illness began. He had been annoyed fourteen years ago with frequency of micturition for nine years, but this had ceased for five years previous to his present ailment.

There was distinct tenderness of the right kidney, which was palpable and seemingly enlarged. There was nodular enlargement of the right epididymus, and a similar condition of the right side of the prostate.

R. Kidney—	L. Kidney—
29 c.c.	14 c.c.
Faint blue tint.	No trace of blue.
Acid.	Acid.
Urea, 4½ gr.	4 gr.
Pus.	Pus.
No tub. bacilli.	No tub. bacilli.
Cryoscopy of urine—.66.	—.64.
Cryoscopy of blood—.58.	

The instrument not only indicated, then, that both kidneys were inadequate, but that the right one, which was suspected to be chiefly at fault, was really the better of the two. A nephrectomy under such circumstances would have been a surgical calamity. The patient succumbed to his malady shortly after returning home.

CASE III. Mrs N., aged 30, has suffered for fifteen months from frequency of micturition, dull gnawing pain in the lumbar region, and, latterly, the occasional passage of small clots or blood-stained urine, with scalding pain. There was slight tenderness in the left loin. Pus and tubercle bacilli were found in the urine. Previous health good.

R. Kidney—	L. Kidney—
Deep blue, clear.	Faintly yellow, turbid.
16 c.c.	6.5 c.c.
Acid.	Neutral.
1024.	1006.
Urea, 10 gr.	Urea, 1 gr.
No pus cells.	Many pus cells.
No tub. bacilli.	Many tub. bacilli.

Cryoscopy of blood—.56.

The case appeared most favourable for surgical intervention, and the left kidney was accordingly removed. The patient was troubled with slight vomiting every day after the operation. She passed urine freely and the bowels acted well. The wound was dressed on two occasions, and was normal in every respect. Temperature rose for the first three days, gradually falling. The pulse then became very feeble and she appeared greatly exhausted, and expired on the afternoon of the 23rd March.

At the sectio there was found miliary tubercle of the stump of the left ureter, of the bladder, and urethra. The right kidney showed no signs of tubercle, but slight recent interstitial nephritis. There were small points on the omentum resembling miliary tubercle. Some slightly turbid watery fluid in the peritoneal cavity.

CASE IV. Mrs H., aged 25, of rheumatic habit, constipated, and liable to annual attacks of influenza for the last five

years, injured her right side ten months ago. Seven months ago she was confined, and since that date she has had six attacks of sudden, sharp pain in the right lumbar region, which sometimes radiates to the shoulders. These attacks have been of monthly occurrence, and come on three days after menstruation ceases. During the last two attacks there has been frequency of micturition during the day. There is some tenderness in the right lumbar and iliac regions. Her medical adviser feared calculus. X-ray evidence was negative.

R. Kidney—	L. Kidney—
9 c.c.	7 c.c.
Blue.	Slightly paler blue.
Acid.	Acid.
1025.	1025.
10.75 urea.	10.5.
Pus cells, few.	Less.
Red blood corpuscles, few.	More.
No tub. bacilli.	No tub. bacilli.

The amount of urine from the left kidney was slightly less than that from the right, the pigment was slightly delayed, some of such an intense blue, but in other respects they were about equal. A general consideration of the case led one to regard it as a cystitis, and under rest in bed and urotropine the patient left hospital freed from her frequency of micturition, her painful attacks, and her lumbar tenderness.

CASE V. Mrs C., aged 40, a stout woman, complains of pain in the left side, which she ascribes to a blow she received eight years ago. At this time she was confined to bed for three weeks, and passed blood in the urine. She continued very poorly for a long time after this, and has since suffered from dull gnawing pain in the back and left side, relieved by rest in bed. Two years ago she had pain after micturition, and although the urine was cloudy and muddy some time ago, there has been no pain or frequency of micturition. General examination negative.

R. Kidney—	L. Kidney—
22 c.c.	11 c.c.
Blue.	Very faint blue.
Neutral.	Neutral.
1017.	1010.
Urea, 7½ gr.	2½ gr.
No pus.	Pus.
No blood.	A few corpuscles.
No tub. bacilli.	No tub. bacilli.

The difference between the two secretions is well marked. The patient left hospital *in statu quo.*

CASE VI. Mrs P., aged 45, complains of loss of strength and weight, and of a swelling in the right lumbar region, discovered by her medical attendant, of which she had been previously unconscious.

She had an attack of influenza in January 1905, and has progressively lost strength since. She has no pain nor urinary symptoms. She had pleurisy three years ago. Has otherwise been a strong woman, with a good family history. There is a firm, rounded, dull mass extending from beneath the right costal margin downwards to the iliac fossa, and inwards to within 1½ inches of the umbilicus. The abdominal wall moves freely over it, but it appears to be fixed to the lumbar region.

R. Kidney—	L. Kidney—
30 m.	16 c.c.
No colour.	Blue.
Acid.	Acid.
Urea could not be estimated.	10 gr.
Pus copious.	None.
No tub. bacilli.	No tub. bacilli.

Cryoscopy of blood—.52.

A large left-sided pyonephrotic kidney was found and removed with difficulty owing to extensive and dense adhesions. The patient died of suppression of urine on the following night, only 2 oz. of urine having been secreted.

The two following cases were seen in consultation; in each one kidney was practically useless, from destruction of the kidney.

CASE VII. Mrs B., aged 57. Mentally weak, frequency of menstruation. Can give no history. From the right kidney there was practically no secretion. From the left kidney 6½ oz. of a pale blue colour.

CASE VIII. Mrs C., about 70 years old. Has been losing strength for the last four or five months. There is a large swelling occupying the right renal region, which fluctuates in size and is somewhat tender. The right kidney yielded 1 c.c. colourless fluid. The left, 19 c.c., faintly blue tint; sp. gravity, 1010; urea, 2.8 gr. per ounce.

CASE IX. Mr T. D., aged 36. A poorly nourished miner, admitted for renal colic, has had four attacks of severe left lumbar pain at intervals of about a month. The pain passed down into the groin, was of a sickening character; the patient vomited, but micturition was normal, although the urine was reddish, and deposited a dark red sediment. He got relief by hot fomentations and opium. The attacks followed drinking bouts. On examination the left lumbar region is rigid, but nothing other abnormal can be detected.

R. Kidney—	L. Kidney—
16 c.c.	5 c.c.
Dark blue.	Faint blue.
Acid.	Acid.
1021.	1018.
6 gr.	5 gr.
No pus.	No pus.

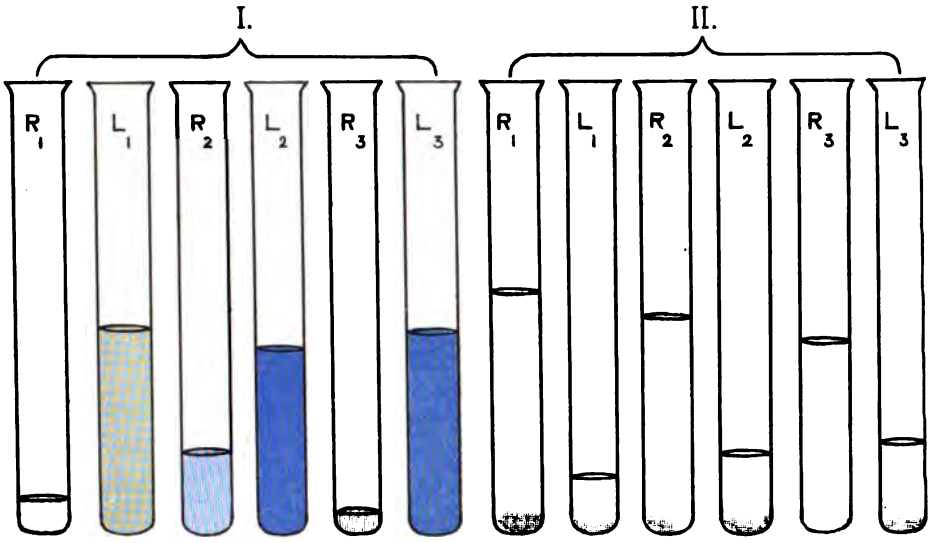
Cryoscopy of blood, .54.

The left kidney was exposed and incised. It bled freely, but nothing other abnormal was found, and the patient left hospital feeling quite well. Prior to his departure the separator was again employed.

R. Kidney—	L. Kidney—
9 c.c.	16 c.c.
Blue.	Blue.
Neutral.	Neutral.
1018.	1016.
8.25.	7.5.
No pus.	No pus.

TUBERCLE, R.K.

TUBERCLE, BILATERAL.



TUBERCLE, L.K.

TUBERCLE, R.K. PYONEPHROSIS.

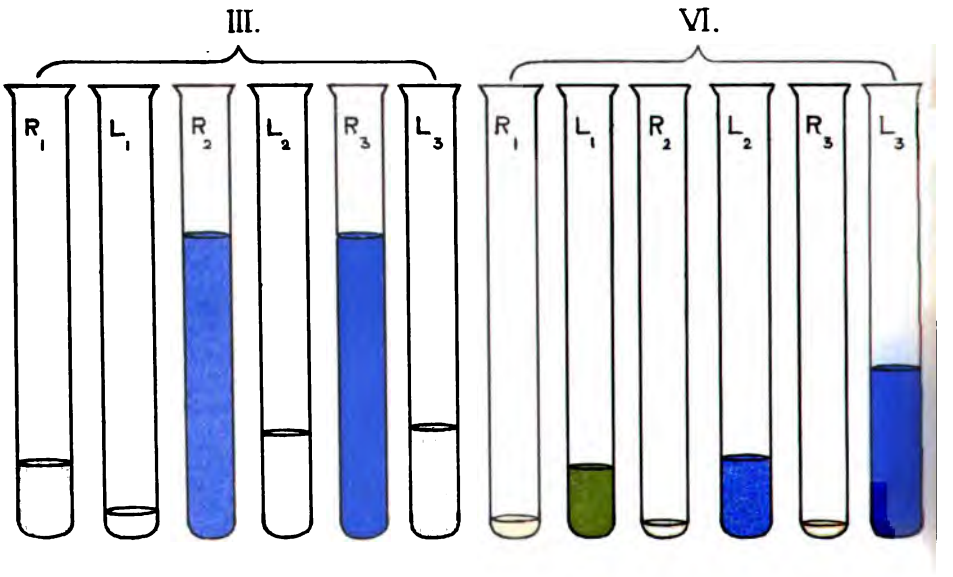
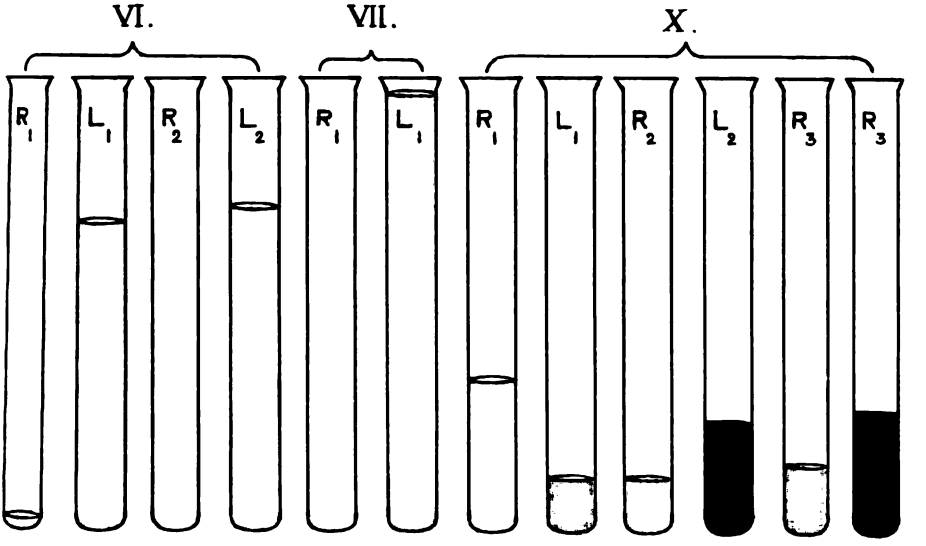


PLATE III.—TO ILLUSTRATE MR CAIRD'S PAPER ON LUYS' SEPARATOR.

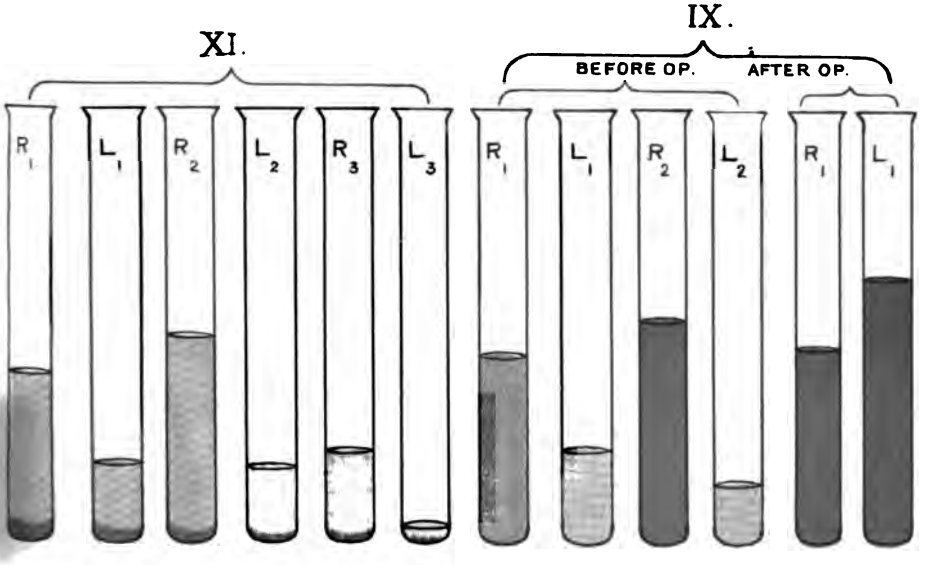
RIGHT KIDNEYS USELESS.

HYDRONEPHROSIS, R.K.



MALIGNANT PAPILLOMA OF BLADDER.

RENAL NEURALGIA, L.K.



CASE X. Miss K., aged 28, from her fourth year has had intermittent attacks of right-sided lumbar pain lasting not more than 48 hours. She has bilious vomiting when the pain is severe. The intervals between the attacks vary from one week to three months. Nine weeks ago, frequency of micturition, pain at the meatus urinarius, and the passage of turbid urine began. The kidney was felt to be displaced and mobile and she got a belt and pad, which, however, afforded no relief. On palpation, an elongated, slightly mobile, renal swelling can be felt.

R. Kidney—	L. Kidney—
9 c.c.	16 c.c.
Faint blue.	Dark blue.
Neutral.	Acid.
1008.	1020.
Urea, 3 gr.	Urea, 8¾.
Bac. coli, none.	Bac. coli, few.

Right kidney, suspected hydronephrosis. On exploration, the kidney was found reduced to a thin expanded layer of renal tissue, cyst like, with a large pelvis. The pelvis was opened to examine the condition of the entrance to the ureter, and dark brown turbid fluid escaped. The case did not seem suitable for transplantation of the ureter, and the kidney was accordingly removed. The patient made an uninterrupted recovery.

CASE XI. Mr W. D., aged 45. The patient complains of the intermittent passage of blood in the water during the last five months, frequency of micturition, and loss of weight. He has constant pain over the left lumbar region, most acute when passing water, and he had also pain shooting down the left thigh to the knee, and pain across the bladder at the meatus during the act.

R. Kidney—	L. Kidney—
18 c.c.	9 c.c.
Blue.	Blue.
Acid.	Acid.
1026.	1024.
Urea, 10 gr.	10 gr.
Blood.	Blood.

Cryoscopy of blood—.54.

The above indications at once strengthened the view that the kidneys were not at fault, but that the patient had a vesical neoplasm, and the cystoscope revealed a large papillomatous tumour of the base and right side of the bladder. Suprapubic cystotomy permitted the removal of the mass from the mucous surface of the bladder. It was impossible to remove the infiltrating base. The bleeding thereafter became much less, and the urine was frequently clear. The fistula healed. The patient left hospital on the 9th May. He returned ten days after, having experienced sharp hæmaturia, and died on the following day of uræmia.

The great service rendered by the separator in the above cases is self-evident. Luys has also indicated its value in solving obscure diagnoses in the case of lumbar and other swellings of doubtful origin. The separator is more easily manipulated than the cystoscope; it may entirely replace the difficult catheterisation of the ureters, and is a method quite within the power of the skilled practitioner.

TUBERCULAR CERVICAL GLANDS[1]

By JOHN MARNOCH, M.A., M.B., C.M.,

Surgeon to, and Lecturer on Clinical Surgery at, the Royal Infirmary, Aberdeen.

General Remarks.

THE recent enormous advances in Abdominal Surgery have led to the everyday performance in this domain of operations which are of absorbing interest both to operators and onlookers, and the result is that an amount of attention is now bestowed upon this department of surgery which twenty years ago was never dreamt of. Moreover, as a direct sequel, medical literature now teems with reports of operations, generally successfully performed, on almost every abdominal organ, for conditions and diseases which not so very long ago were left severely alone as being beyond the pale of surgery. However fascinating this field of work is, it has one drawback—namely, that it diverts attention from, and belittles the importance of, the surgical affections more frequently met with in practice.

[1] Abstract of a Clinical Lecture delivered at the Aberdeen Royal Infirmary.

Among these affections, none is more common than enlargement of the neck glands from tubercular disease, and in some of its varieties none is more troublesome both to patient and doctor. The patience of both is tried, and in the case of the surgeon his operative skill as well.

Clinical Features and Indications for Operation.

It may be useful, then, to recall some of the clinical features of tubercular cervical glands and their surgical treatment, especially as the indications for operation and the best method of carrying it out, thanks mainly to the work of Watson Cheyne, have emerged from a somewhat chaotic condition, and may now be regarded as resting on a sound scientific basis. And yet it is very doubtful if these indications are as well known as they ought to be, for it is not an uncommon experience for cases to be sent to the surgeon that are either quite unsuitable for operation, or that have been allowed to drift into a state which prevents the best results being got from surgical treatment.

Before considering how glands which have actually become tubercular should be dealt with, some reference must be made to those enlargements which are dependent on irritation in the structures anatomically related to them. When one considers the large areas drained by the lymphatics of the neck and how frequently inflammatory lesions are present in some of these, as, for example, in the mouth and throat, it is not to be wondered at if glandular enlargement takes place in the neck quite often apart from tubercular origin. But although this is so, it is of prime importance that these swellings should be carefully treated, for it is now well known that glands which enlarge primarily from this cause may later on become tubercular unless the source of irritation be removed. Whether the inflamed glands form a suitable nidus for the tubercle bacilli already in the blood stream, or whether the organisms gain entrance at some breach of surface about the mouth or throat and pass on to the glands, is a debatable point. There seems to be considerable evidence in favour of the view put forward by Sims Woodhead—namely, that the tonsils and adenoid tissue of the throat are the first to meet the tubercle bacilli, and that if healthy they are capable of giving an account of

a moderate number of the invaders, but that if they are debilitated by repeated attacks of inflammation they lose their powers of resistance and permit the organisms to pass on by the lymphatic vessels to the glands, in which they settle. Whatever the explanation may be, the fact remains, as already stated, that these inflamed glands may ultimately become tubercular. It behoves us, then, whenever cases of enlargement of the neck glands, especially in the earlier stages, present themselves for treatment, to make a thorough examination of the areas drained by the glands, and to remove every possible source of irritation. This is a point that cannot be too strongly emphasised, as it not infrequently happens that cases are sent up for operation upon the glands when what is really required is the removal of an offending tooth or hypertrophied tonsils and adenoids. Indeed, I have even seen treatment applied to the occipital glands which were swollen from the irritation of an eruption of the scalp. Early removal of the exciting irritation quickly causes these glands to subside and give no further trouble.

Turning now to tubercular glands, considerable confusion has arisen in connection with their operative treatment, mainly, I think, from the impression that in their case the indications were of a special and exceptional character. This is really not so, for if allowance be made for their exposed situation, the indications for operation are essentially the same as in most other tubercular diseases, as, for example, in joints. No one nowadays thinks of temporising with a joint which is the site of abscess or sinus formation. Fortunately, in the surgery of joints a more general recognition of the value of prompt operative interference under such conditions obtains; and yet when abscesses or discharging sinuses are situated in the neck, less compunction is often felt in leaving them alone. Why should a softening or broken-down gland be left to nature unaided any more than a suppurating joint? It is quite true that the joint affection is a more disabling thing than the discharging neck, for while a young adult with the latter can often continue at work, with the former he is obliged to lay up. The mere fact, however, of these gland patients being able to follow their occupation is no justification for leaving them insufficiently treated. Many of them at the expense of

a week or two's work can by operation be put into an infinitely better state for their occupation than they were when kept below par by continuous discharge. Besides, the cosmetic result after operation is not to be compared with the puckered, drawn, irregular cicatrices of nature. The occurrence, then, of suppuration, with or without sinus formation, is the first indication for operative interference.

The next indication, namely, when the glands are causing deformity, is more peculiar to the neck on account of its exposed position. Generally speaking, when tubercular glands have become large enough to cause an unsightly tumour, softening has set in and quite frequently the inflammation has spread outside the capsules to the surrounding areolar tissue. This has the effect of obscuring the outlines of the individual glands by matting them together and at the same time rendering them fixed and immobile. But there is another way in which the outlines may be obscured and in which a bunch of glands feels almost like one tumour with a uniform even surface, namely, where they lie beneath the sterno-mastoid muscle. Here of course the glands are situated at a considerable depth and the thick elastic muscle spread over them prevents the palpation of the individual glands and produces the ugly pig-like neck one so frequently sees.

The next type of case that requires operation is where the glands, although not large, are infecting those in the immediate neighbourhood. Such cases require close and frequent watching, and if sent away for climatic treatment, must either be put under the care of a medical man near their residence, or, where this is not possible, be brought back at short intervals for examination. The reason is that tubercular glands of the neck are somewhat erratic in their rate of enlargement. While some gradually subside under general treatment, others may remain stationary for a time and then rapidly enlarge and infect others near them.

You will observe, then, that the cases in which operation is to be recommended group themselves into three clinical types: first, where there is suppuration or sinus formation; second, where deformity is caused; third, where the disease is progressive in character, fresh glands becoming infected.

Hints on the Examination of the Neck.

The neck should be examined from two positions, namely, from the front and from the back, and of the two, the latter is the more valuable. Standing behind the patient one can ascertain by palpation the extent, consistence, and mobility of the glands, much better than from the front, and this method of examination ought never to be omitted in any disease of the neck characterised by tumour formation. The examination should be conducted also with the head in different positions so as to relax or make tense, as occasion requires, the various structures of the neck. Thus, in order to ascertain the full extent of glandular invasion say in the anterior triangle, the head should be flexed, and it will be found that the fingers can feel deeply beneath the sterno-mastoid. On the other hand, a better idea of the consistence of the swellings can be got with the head in the extended position. Now, it is frequently no easy matter to be able to say whether glands are softening or not. One obvious reason for this is the depth at which they often lie. Then, again, softening may have taken place in the centre while the cortex is quite firm, and lastly, a whole gland may have completely liquefied but the intact capsule is so tightly distended that it closely simulates a solid gland. Experience, however, will enable you to recognise softening, and I should say that in any case where you are in doubt whether it is present or not, you will be pretty safe to conclude that it has. I would strongly urge you to palpate these cases in the wards before they come to operation, and then, after excision, to split the glands open and examine them for yourselves. I am sure you will often get a surprise by finding that glands which you thought were solid are in an advanced state of liquefaction.

From an operative point of view it is of considerable importance to ascertain whether the swollen glands belong to the superficial or deep set. At the upper part of the anterior triangle especially, a mass may appear to be quite superficial which has in reality deep connections. In such cases a good plan is to put the sterno-mastoid into action by asking the patient to turn the head to the opposite side, when it will be

seen that the glands are projecting into the triangle from beneath the anterior edge of the muscle.

Treatment.

It is not the purpose of this lecture to deal with the general medical treatment, but some reference must be made to local applications occasionally used before operation is recommended. First, as regards the poultice. This is applied with different objects in view, some, indeed, diametrically opposed to each other. It is employed with the idea of allaying pain, and there can be no doubt as to its frequent efficacy in this respect, but pain is rarely a prominent feature of tuberculous lymph glands, indeed, it is seldom present. Then, again, a poultice is sometimes used with the idea that it will do either of two things: either it will cause absorption of the hyperplasia producing the swelling, or else it will hasten the occurrence and completeness of softening. There is certainly no proof that moist heat can do either, while on the contrary prolonged poulticing may unquestionably do harm by rendering the skin soft and sodden and thereby militate against good healing after operation. Fortunately in this disease the use of this homely remedy is on the wane, more especially in sinus formation, where, besides softening of the skin, a considerable area of eczema may be induced. Iodine also is another remedy used locally in the treatment of enlarged glands, and here, also, it is very doubtful whether any good result is got by its application to glands which have really become tubercular. When one hears of such local applications having reduced the size or caused the disappearance of swollen glands, it seems very probable that in this instance one has to deal with glands which are not tubercular at all, but which have become inflamed from some irritation in the area drained by them, and that the decrease in size is due to the subsidence of the irritation and not to the applications. The less these tubercular lymph glands are irritated by local applications the better. If anything is used it should take the form of some simple, comfortable splint which will both protect the glands and steady the head.

The ideal surgical treatment is complete excision, which

should be carried out whenever possible. In order to get the best results both from a cosmetic point of view as well as from the point of view of eradication of the disease, the operation should be performed before suppuration has occurred, and certainly before it has extended beyond the capsules of the glands, or caused sinus formation. It should also be understood that periadenitis with its consequent matting adds materially to the difficulty of the operation and indeed may render dissection impossible. The diagrams which are before you show the lines of incision for clearing out glandular enlargement in the various regions, and when the incisions are placed as they now are along some of the natural folds of the neck, the cosmetic result is exceedingly good. The operation is seldom one that can be performed quickly, for the deeper glands in the anterior triangle are invariably in close contact with the sheath of the internal jugular vein, and indeed often also adhere to it. To clear this area requires patient and careful dissection in order to avoid wounding or tearing the vein. When the glands are adherent to the sheath, the best and the safest way is to remove the adjacent part of the vein with the glands, a procedure that can be carried out with impunity. A structure which gets in the way and requires to be avoided is the spinal accessory nerve, which may lie on or run through the centre of the mass, but is not difficult to identify and can be lifted aside or dissected out.

While complete dissection is the ideal procedure, it must not be understood that it can always be done and that scraping has no place in the treatment of this affection. The spoon may have to be employed in conjunction with complete removal by dissection or by itself. When there is a subcutaneous abscess, or when a softened gland bursts during removal, then the spoon is indispensable for getting rid of the softened material, after which dissection of the remaining glands is proceeded with. Then, again, when sinuses have formed, these must be scraped out and disinfected before removal of the glands is undertaken. Scraping alone has to be adopted where there is extensive glandular invasion and matting, with here and there softening areas. It must be borne in mind, however, that one occasionally comes across cases belonging to this class where the scraping so causes the periadenitis to subside that subsequent

complete removal becomes possible. There is one condition where you may be tempted to rely entirely on the spoon, and that is where apparently one gland alone is involved and has undergone softening. It cannot be said that this does not occur, but my experience is that usually in close relation with the softened gland, often behind it, are one or two smaller ones which are not detectable by palpation, but which must be shelled out after the softening one is dealt with, or else the patient comes back again in a few weeks with a recurrence of his disease in the same place. Then it should be remembered that a subcutaneous abscess frequently communicates through a small opening in the deep fascia with a cheesy mass lying below, and this also, as well as the more superficial pus, must be cleared away if good and rapid healing is to ensue. When the spoon is used, therefore, it must be employed very thoroughly, and the scraping should be vigorous, so as to ensure the clearing away not merely of the parts of the gland which have liquefied, but the solid parts as well; and in order to ascertain whether that has been accomplished or not, there is nothing better than the finger. If the capsule of the gland has been quite emptied, then it feels quite smooth; whereas if some of the glandular material still adheres, it is detected at once by touch as a roughening on the otherwise smooth surface. After a scraping operation, an excellent plan is to apply some pure liquid carbolic acid to the cavity, and then, in many instances, stitches can be employed and good healing result. Broken-down tubercular material, unless infected, is not septic like the pus of an acute abscess, and if it is all got rid of, healing by first intention is to be expected.

Drainage should be employed after operations on the neck, even in aseptic cases, more frequently than in other regions, as it is impossible to apply sufficient pressure by dressings and bandages to arrest the post-operative oozing, which, unless drained away, accumulates and gives rise to subsequent bother, or may even favour the occurrence of sepsis.

Such, then, is the treatment of tuberculous lymph glands, but even in complete dissection uniform success must not be looked for. Now and again a case dealt with apparently in the most thorough and satisfactory manner comes back again with a recurrence, and it is disappointing to have to tell the

patient that another operation is necessary. Such recurrences are seldom serious, and the patient can be reassured by the fact that his second operation will not be so extensive an undertaking as the previous one.

NOTES ON CEREBRAL LOCALISATION[1]

By ASHLEY W. MACKINTOSH, M.A., M.D., Aberdeen

THE subject of cerebral localisation is an immense one, and I can touch on only a very few points. You may find my remarks somewhat dry and perhaps too full of detail; but they deal with a subject of the very greatest practical importance, and I hope to be able, at least, to impress on your minds some general points which may not only help you in your clinical work, but also stimulate you to try by your personal observations to clear up some of many doubtful points. I shall say nothing regarding the history of the subject. But I would emphasise the fact that the clinical observations of Hughlings Jackson and the experiments of Hitzig and Fritsch and of David Ferrier really laid the foundation of rational surgical treatment of cerebral disease. Brain-surgery is guided by localisation, and the fact that the percentage of successful results in operations for cerebral abscesses, tumours, etc., is improving, surely if slowly, is due as much to greater accuracy of cerebral localisation as to improvement in surgical technique.

I shall begin with the *motor* areas of the cortex.

A. The *extent* of the motor areas has gradually become narrowed. So much of our attention has, for various reasons, been devoted to motor functions of the brain, that we are apt to forget that the motor area of the cortex occupies only a very small portion of it compared with the areas which are concerned with sensation. The clinical observations of Jackson and the experiments of Ferrier on the bonnet-monkey have long been assumed to prove that the motor cortical areas include the two central convolutions, the paracentral convolution and the bases of the frontal convolutions (for lateral movement of head and eyes). More recently, however, doubt has arisen as to the

[1] A lecture delivered to the Aberdeen University Medical Society, May 26, 1905.

motor function of the posterior central (ascending parietal) convolution, and there is a growing body of evidence—experimental, clinical, embryological, and histological—that the motor areas in the higher types of monkey and in man lie entirely in front of the Rolandic fissure. Thus Flechsig has found embryological differences between the two central convolutions, which, he believes, justify him in regarding the anterior as the seat of outgoing motor impulses, and the posterior as the seat of incoming sensory impulses. Again, histologically, a specific motor type of cortex has been described by Cajal as existing in the anterior central (passing over into the paracentral), but not in the posterior central convolution. Clinical proof of this limitation of the motor areas is found in cases of monoplegia, in which the anterior central convolution alone has been found involved post-mortem; cases are also on record in which lesions of the posterior central convolution have caused little or no motor paresis. But the strongest and most striking evidence in favour of the limitation of the motor areas to the cortex in front of the Rolandic fissure is supplied by experiments of Sherrington and Grünbaum on anthropoid apes (*Brit. Med. Journ.*, vol. ii., 1901, p. 1857). The special value of these experiments, as regards cerebral localisation in man, lies in the fact that the brain of the anthropoid apes presents the type which comes nearest in development to man's; Ferrier's experiments were performed on the macaque (bonnet) monkey, a much lower type. The outstanding feature of Sherrington and Grünbaum's results is that excitation of the post-central convolutions, even by strong currents, never evoked any effect; the cortical areas, whose stimulation did cause movement, *i.e.* the "motor" areas, occupied the whole anterior central convolution, extending into the depth of the Rolandic fissure and over to the paracentral convolution on the mesial surface, and also forward to the bases of the frontal convolutions (movement of eyes). Ablation experiments gave the same result; small destructive lesions in the anterior central gyrus caused marked paralysis and descending pyramidal degeneration, while similar and much larger lesions in the posterior central gyrus did not cause even temporary paralysis, and no unequivocal degeneration followed. These results are of great interest. They seem to show clearly that the motor

area forms a smaller part of the total surface of the brain in the higher than in the lower types of monkey. We may assume *a fortiori* that this is probably still truer in the case of man, but only more clinico-pathological observations can afford the *proof*, and it is for us to bear this in mind.

I shall make only one other remark regarding motor function. Certain centres for movement of the head and eyes have been found experimentally in the bases of the frontal convolutions—a centre for movement of the eyes alone, and another for movement of both head and eyes to the opposite side. There is no sure evidence as yet as to the position of these centres in man, or, indeed, as to the existence of these separate centres. But I think that their existence was proved in a case under my observation, a well-marked case of Jacksonian epilepsy, in which the fits usually began in the right arm or face—in these fits the eyes were turned to the extreme right, but there was no apparent movement of the head. Sometimes the fits started in the right leg, and then spread to trunk and arm, and last of all to the face; in these fits, head and eyes were turned simultaneously to the extreme right.

B. We come now to a second question. Are the so-called "motor" areas purely motor, or have they a sensory function as well, *i.e.* are they sensori-motor? It is indeed an old view, and one still held, that these centres are in reality not motor at all, but sensory; that the movements evoked by their stimulation are of a reflex nature, the true motor centres being elsewhere (*e.g.* in corpora striata); and that the disturbance of movement produced by destruction of these centres is akin to ataxia, and is due to loss of tactile sensibility (Schiff), muscular sense (Hitzig, Nothnagel), sense of movement or kinæsthesis (Bastian)—the so-called motor centres being believed by the different authors to be the seat of these various senses. But, putting this extreme view aside, we find that neurologists are sharply divided into two camps: those, like Ferrier in this country and Mills in America, who hold that the motor centres are purely and directly motor, and those, a larger and apparently increasing number (Dana, Starr, Horsley, Dejerine, etc.), who hold that the motor areas are also sensory, being concerned specially, but not exclusively, with muscular sense and the so-called stereognostic sense.

The chief arguments adduced in favour of the view of separate localisation of movement and sensation in the cortex are these :—

I. There are many cases on record of lesions involving the motor area of the cortex and the region in front of it, in which no objective sensory phenomena were present. Experimentally, also, destructive lesions of the motor cortex in animals have caused no sign of impairment of sensation : Ferrier insists on this.

II. If it is true, as Charcot held and as we have been taught, that the sensory tract is quite distinct from the motor in the internal capsule, it is probable that the upward extensions of these tracts will pass to separate cortical regions. It may not be known to most of you that there is some tendency to abandon Charcot's idea of the sensory crossway : thus, Dejerine holds that motor and sensory fibres are mixed together in the internal capsule—rather an upsetting idea.

III. There are not a few cases on record in which cortical lesions have caused sensory loss without any motor paresis or before such paresis has appeared. This is true specially of loss of muscular sense and of the stereognostic sense. I shall name a few examples. Starr and M'Cosh (*Amer. Journ. of Med. Science*, 1894) record a case in which a small angioma was removed from the superior parietal convolution, *i.e.* quite behind the motor areas : this was followed by complete loss of muscular sense in the opposite hand and wrist, with ataxia, but without any motor paralysis or other sensory loss. Again, Mills and Keen (*Journ. Nerv. and Ment. Dis.*, 1900, p. 244) record a most interesting case of tumour of the superior parietal lobule, which was successfully removed by operation, having been accurately localised, because the earliest symptoms—before any motor paralysis appeared—were sensory, viz. impairment of cutaneous sensibility, loss of muscular sense with ataxia, and astereognosis. So, Mills (*Journ. Nerv. and Ment. Dis.*, 1901, p. 595) records a case which presented ataxia and astereognosis with no motor paralysis, in which autopsy showed a softening limited to the superior parietal lobe.

I could quote similar cases of disease or trauma, which support the view that motion and sensation are represented in distinct parts of the cortex, but these will suffice. In passing,

I should like you to note that the cases cited appear to afford striking proof of a special function of the superior parietal region, viz. that it has to do with the representation of muscular sense (the loss of which causes ataxia) and the stereognostic sense. The supporters of this view of the separate representation of motion and sensation locate the sensory centres in different parts of the cortex. Clinical evidence is generally held to be opposed to the inference drawn by Ferrier from experiments on animals, performed by himself and Horsley and Schäfer, that a part of the mesial surface of the hemisphere (gyrus fornicatus and hippocampal region) has an exclusive relation to cutaneous sensibility. This region is generally accepted as one seat of sensation, but it is believed, on the evidence of such cases as those quoted above, that there is also a great sensory area on the outer surface of the hemisphere behind the motor areas, in the posterior parietal region and probably also in the posterior central (ascending parietal) convolution—you will remember that there is reason to doubt the motor function of the latter convolution—and we have seen that there is clinical evidence to show that this sensory area has to do specially with muscular sense and the stereognostic sense. Mills (*St Louis Med. and Surg. Journ.*, 1904, p. 233) states his belief that "the cutaneo-muscular sensory area encircles on all sides the great motor area" both on the lateral and the mesial aspects, and he thinks that there are clinical and experimental facts which render it "probable that the areas of representation of cutaneous and muscular sensibility are subdivided in a manner analogous to the subdivision of the motor area." Ferrier, on the other hand, is inclined to regard experimental evidence as "against any absolute differentiation of centres of tactile sensation for special regions." Mills quotes a suggestive observation of Sherrington and Grünbaum, in their experiments on anthropoid apes, that, while faradisation of portions of the cortex of the posterior central convolution did not evoke any motor response, it facilitated this response in portions of the anterior central convolution at the same horizontal level.

So much, then, for the view that the motor and sensory cortical areas are quite distinct.

An equally strong position is taken up by those who hold that the so-called motor centres have also a sensory function—

that they are sensori-motor: it is especially, but not entirely, muscular sense (and, within recent years, the stereognostic sense) that is believed to be represented in the motor areas. The chief arguments in favour of this view are:—

I. Clinical, and II. Experimental.

I. (*a*) First and foremost comes the large number of recorded cases of lesions of the motor areas, alleged to be confined to those areas, in which sensory as well as motor phenomena have been present. Of course the great difficulty is to be sure that the effect, direct and indirect, of the lesion is confined to the motor areas, and the advocates of the first view try chiefly in this way to explain away such cases; the lesion is not strictly limited to the motor areas, or it causes sensory defect which is purely hysterical, or at least functional; or the anæsthesia is due to pressure, circulatory disturbances, etc., which affect parts beyond the actual extent of lesion. You will remember that, according to the first view, the sensory areas adjoin the motor.

Horsley, a strong advocate of the sensori-motor nature of the motor areas, holds (*Practitioner*, Nov. 1904) that he has "unimpeachable facts" to show that "coupled with every destruction of the motor region of the cortex, producing localised paralysis, we shall have also localised paralysis of sensation"; and further, that there is a quantitative relationship—the extent of anæsthesia being in proportion to the amount of cortex involved; moreover, the characters of the sensory loss are *pathognomonic* of a lesion in the motor region of the cortex, viz. the anæsthesia is not absolute ("because this is not the only part of the brain in which sensation is represented"), and it includes slight defect of actual sensation of touch and loss of localisation-muscular sense: such characters of anæsthesia are not found in deep lesions of the brain, below the optic thalamus, and therefore have great diagnostic value. He records one case which he regards as "an absolute test of the correctness" of the view that the motor areas have also a sensory function; the patient had fits, beginning with movement of a thumb, and he had loss of muscular sense in the thumb. A tumour was found and removed from the thumb centre, with resulting loss of power of apposition of the thumb. Post-mortem, it was found that the piece of cortex destroyed at the operation was very small, viz. the thumb area.

I shall not quote further cases of a similar kind—they are many. In favour of the same view, and more especially of the belief that the stereognostic sense has its principal seat in the motor areas of the cortex, are the observations of Walton and Paul (*Journ. Nerv. and Ment. Dis.*, 1901, p. 191). They find that, in cases with anæsthesia resulting from lesion of the Rolandic region, the one *constant* sensory disorder, whenever tested, has been that of the stereognostic sense; astereognosis has been present in every case of Rolandic disease coming under their observation since commencing this study. Purely motor hemiplegia, they believe, is not so common as was formerly thought. This latter belief is confirmed by the observations of Gordon (*Journ. Nerv. and Ment. Dis.*, 1903, p. 144) on 35 cases of motor paralysis of cerebral origin; in only 1 case was no sensory loss noted, and 22 had complete astereognosis, 7 partial—a very striking result. Gordon also finds a distinct parallelism between the motor and sensory disturbances, as regards both distribution and degree. Dercum (*Journ. Nerv. and Ment. Dis.*, 1900, p. 569) found that 20 of 41 cases of hemiplegia showed astereognosis, complete or partial. The frequency of coincidence of sensory with motor loss brought out by these two writers is certainly remarkable, but it is right to note that the situation and extent of the lesions were not established by autopsy. It is possible also that, in view of the probability that the motor areas do not include the posterior central convolution, the arguments in favour of the sensori-motor function of the motor areas may have to be revised.

(*b*) In convulsions due to irritating lesions in the motor region of the cortex, a sensory aura often precedes the motor spasm.

II. Experimentally, destructive lesions of the motor areas have caused sensory loss (Munk, Schiff, Hitzig, etc.). Further, experimental lesions in the region of the optic thalamus have shown that fibres pass up into the Rolandic area as much as towards the mesial aspect of the hemisphere (Horsley).

As a practical result of these remarks on the extent and nature of the motor cortical centres, I would ask you to note in your future clinical and pathological work all facts for or against these propositions:—(1) The motor areas lie entirely in front of the Rolandic fissure. (2) Lesion of the motor areas

causes purely motor symptoms. (3) In lesion of the motor areas, along with motor disturbance, there is always, or generally, disturbance of sensation, more especially affection of the muscular and stereognostic senses. I would also emphasise the fact that there is clinical evidence to indicate that, in cases where sensory loss, more especially loss of muscular and stereognostic senses, predominates, the surgeon should expose the surface of the brain behind the Rolandic fissure, over the posterior parietal region.

C. There is another question, not so much considered, regarding motor function. Can there be a motor paralysis, a loss of voluntary and spontaneous motor action, without any affection of the cortical motor areas, or of the pyramidal fibres coming from them? Strange as it may appear, an affirmative answer is given to this question. If the sensory centres in the cortex, general and special, or the tracts connecting them with the motor areas are destroyed, experimental evidence goes to show that there is a complete absence of voluntary motor acts. Munk found such motor paralysis in dogs after extirpation of the sensory cortical area, and he called it "soul-paralysis." But some most interesting experiments of Mott and Sherrington indicate that not only the sensory centres in the cortex, but the entire sensory tract to the periphery, play a part in the voluntary acts of the body. They experimented on monkeys, cutting all the *posterior* roots connected with the extremities on one side, and they found that the movements of the hand and foot were practically abolished, permanently they believed; the animal could no longer use the hand for grasping or for bringing food to its mouth, or use the foot and leg for climbing. I saw one of these monkeys, and the appearance of complete motor paralysis was most striking.

There are also clinical cases on record in which, with motor areas and tracts intact, there was complete loss of voluntary and spontaneous motor power, due to loss of sensation, central in origin. Thus, Bruns records the case of a man who, after an apoplectiform attack, showed *inter alia* right-sided diminution of senses of touch and pain, muscular sense, and sense of posture. The right arm was never used spontaneously, but lay as if paralysed alongside the patient; the arm was, however, used for reflex acts, *e.g.* scratching, and, when the patient was

shown how to make a movement, and especially when the movement was made passively on the arm several times, he was able to repeat it perfectly. Post-mortem the motor areas were quite intact; there was softening of the cortex and subcortex, of the temporal, parietal, and angular convolutions.

A very interesting case of this "soul-paralysis" has been recorded quite recently by Hoppe (*Journ. Nerv. and Ment. Dis.*, March 1905). A woman, aged 47, four weeks after an apoplectic seizure followed by right hemiplegia, had regained some power in the leg, but the arm remained absolutely helpless; the arm was flaccid, reflexes absent. There was analgesia, thermo-anæsthesia, loss of muscular sense and sense of position, astereognosis in the right arm; she did not know where the right arm and leg were unless she could see them. She could not make the slightest spontaneous movement with the right arm, but if she was told to watch the doctor's hand closely and then told to repeat the movement, it could be executed at once. With practice, she was enabled to make gross movements of the arm *when asked to do so*, especially when she first saw them executed for her; but only on the rarest occasions, and by a special effort of will, were the right hand and arm used spontaneously, and all movements were less perfect when performed with closed eyes. She could imitate all passive movements of the normal arm with the paralysed arm.

This apparent paradox—motor paralysis without lesion of motor centres or tracts—is explained thus:—A spontaneous or voluntary act is in reality a reflex act, and is possible only if the higher cortical reflex arc is intact. When an act is performed as the result of an impulse of will, it is necessary that the previous sensory impressions, obtained from similar acts in the past, should first be marshalled in their proper places in the sensory centres, and stimuli then must pass from these sensory centres to the motor centres, thus producing movement. In "Soul-paralysis," the paralysis is due to a break in the sensory or afferent section of the reflex arc. Such afferent stimuli pass not only from the general sensory areas, but also from the visual and auditory centres and from the sensory centres of the opposite side; hence it was that, although spontaneous movement was impossible, the patient could make movements when the hand was seen, or when he was com-

manded to make them, or when he imitated passive movements of the normal arm with the paralysed arm.

It will be well to remember the possibility of such a condition as soul-paralysis. I can recall one case of hemiplegia which may have been an example of this condition: I was not aware of its existence at the time. I was greatly struck by the fact that, at a date four weeks after onset, there was absolute flaccidity and absence of reflexes in the paralysed limbs, and I was informed that, although these limbs lay absolutely helpless and were unable to make the slightest voluntary movement, reflex acts were well performed by them.

D. My last remarks will be on the "stereognostic" sense, or the power of recognising objects by feeling them, usually by handling. This power is, however, not confined to the hands, but is shared to some extent by the soles of the feet, and to a smaller extent by the general surface of the body. It is really not a sense, at least a simple sense; it is rather a judgment (Burr) or a faculty. I think that the subject deserves more consideration than it has received, especially from writers in this country. This sense is very frequently lost or impaired; thus Gordon (*loc. cit.*) found 29 instances of astereognosis, or loss of the stereognostic sense (absolute in 22), among 35 hemiplegics; while Dercum (*loc. cit.*) noted defect or loss of the sense in 20 of 41 hemiplegics, 2 of 3 ataxic paraplegics, 5 of 16 tabetics. Again, loss of this sense may be of value as a localising sign in cerebral disease, as we have already seen.

In considering the stereognostic sense, we have to deal with two questions separately.

I. What are the elementary sensations, with their relative values, which contribute to this faculty? Some years ago (*Scot. Med. and Surg. Journ.*, 1900, p. 161) I analysed recorded cases of astereognosis, and found that the sense of pressure, the tactile-localisation sense and the muscular sense (especially the power of appreciating weights) appeared to be the most important factors. More recent analyses, based on much more extensive material, tend to show that the chief factors are the "spacing sense" (*i.e.* the ability to distinguish two or more impressions made at one and the same time), the localisation sense, and the muscular sense (especially knowledge of the

position of the fingers); these senses enable us to determine the size and shape of surfaces; the sense of weight will tell the weight of objects; the pressure sense will tell something of consistence as well as of weight; sense of pain will tell whether an object is sharp or blunt; sense of temperature will tell something of the material of an object, *e.g.* whether it is made of metal or of wood; sense of touch has no special value, although it would certainly seem to be necessary—some think not.

The full stereognostic concept of an object depends on the perception of a variety of physical qualities of the object: according to the sensation or sensations which are defective there may be a loss of knowledge of particular qualities of the object, *e.g.* size or shape or consistence. It would be an interesting study to test cases from this point of view, in order to determine what sensations are specially necessary for the perception of the individual qualities of an object.

II. How does this complex of sensations lead to the recognition of an object? The various sensations must be correlated or combined in the cortex; many writers think that there is a special stereognostic area of the cortex, in which this correlation takes place and where the memories of objects handled are stored up, just as it is held that the visual memories of objects are stored up in a special area (occipital lobe). As we have seen, this stereognostic area is generally held to be in the superior parietal region behind the motor areas, although some locate it in the motor areas themselves. But granted that there is such a special area for storing up stereognostic impressions, is this sufficient *per se* for the recognition of objects handled? I believe that the most potent factor in the conception of the vast majority of objects is the visual, not the stereognostic, and I think that we generally or habitually call up the visual memory of the object handled before we recognise its full nature and uses, *i.e.* I hold that the impressions got from handling an object must call into action the visual centres before the object is recognised. There are, no doubt, differences according to (1) the nature of the object, especially with regard to the sense to which it is usually presented, and (2) individual peculiarities in different people. The relative importance of the different factors in the concept

of an object may be altered by special training and in special circumstances, *e.g.* a congenitally blind person may recognise objects by handling, although there are no visual impressions at all.

From what has been said, you will see that astereognosis may arise in one of two ways :—

(1) From defect or loss of one or more of the elementary sensations. This may occur in diseases of the peripheral nerves, cord, pons, medulla, or brain. We have seen the probable relative importance of the different forms of sensation. (2) From central disease which causes either (α) defective correlation of the various sensory impressions, *e.g.* by a lesion in the so-called stereognostic area of the cortex ; or (β) interruption of the tracts connecting the seat of this correlation with other sensory centres (especially visual), which are called into action when we recognise an object by handling. In both of these forms of the central variety of astereognosis, all the elementary sensations may be intact—*pure* astereognosis ; such cases have been recorded, generally combined with object-blindness, and this combination is easily understood if the visual memory of an object is generally recalled before it is recognised by handling. In support of this view, I may refer to a very interesting case of brain tumour which came under my observation last year and which some of you may have seen in the Infirmary. In order that you may understand my reasoning from this case, I shall make a few preliminary remarks. Objects are seen, *i.e.* simply perceived, if the optic nerves, tracts, and radiations and the cortex of the cuneus and calcarine fissure region are intact. But they may be seen and not recognised : this is "object blindness." Different explanations of this condition are given, but I shall name only one, viz. the visual memories of objects are stored up in a particular part of the occipital region : if this part is destroyed as by a tumour, while the cuneus region and the optic radiations are intact, objects may be seen but not recognised. Objects, however, may be seen and also recognised, but the patient may be unable to *name* the object at sight if the visuo-auditory tracts are destroyed, *i.e.* if there is a lesion at the junction of the occipital and temporal convolutions. This condition is known as *optic aphasia* (Freund). But there is a rarer form of aphasia, due to loss of

the power of naming objects although they are recognised, viz. *tactile aphasia*: in this condition objects can be recognised by handling but cannot be named. Vorster (*Arch. f. Psych.*, Bd. 30, 1898) records such a case, and finds only eight others in literature; it is, therefore a rare condition. Now, in *every* such case, the tactile aphasia was combined with optic aphasia; this is surely very suggestive of the activity of the visual centres when an object is handled. For, if stereognostic perception alone sufficed, we should surely expect to find cases of tactile aphasia due to destruction of the stereognostic-auditory tracts without implication of the visual centres and visuo-auditory tracts, *i.e.* without optic aphasia. In the case of brain tumour referred to, the great localising sign was that the patient could recognise most objects equally well by sight and handling and could indicate their uses, but he could not name them. The tumour was localised in the left lower occipito-temporal region, and Mr Gray removed it from that situation; it did not involve what we may call the direct stereognostic-auditory region, but it must certainly have very greatly interrupted the visuo-auditory tracts. This case, while it may not *prove* anything, seems to afford some evidence of the view that stereognostic perception alone is not sufficient, but requires the activity of the visual centres, at least before an object can be named by handling.

In conclusion, I would ask you to remember that there are two problems connected with the stereognostic sense and that they must be kept separate: (1) the kind and relative value of the elementary sensations which contribute to this faculty; and (2) the nature of the central process. I think the subject is of sufficient interest and importance to justify me in urging you to include the stereognostic sense in the routine examination of the sensory condition in cases of nervous disease. May I also suggest that, from the clinical material at their disposal in the Infirmary and elsewhere, one or more of the members of your Society might make contributions on some of the many branches of this subject, which would be of great interest to the other members and of real value?

PRELIMINARY CONSIDERATIONS ON THE RELATION OF THE SUPRARENAL BODIES TO GENERAL MORBID PROCESSES

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STUDY of the ductless glands in recent years has served to demonstrate ever more clearly the vast importance of these organs in the general metabolism of the body and the large part they play in many pathological processes.

In all branches of medicine, discoveries in connection with these bodies have served not only to fill up gaps in our knowledge of diseases and to shed new light on hitherto dark places, but have actually opened up fresh avenues for thought and examination, permitting of consideration of many subjects from an entirely novel standpoint, and encouraging us to believe that the first steps have been taken along a path leading to hitherto utterly inaccessible heights of knowledge. And while this is true of all such bodies, and the relative importance of each is as yet quite undetermined, of none is it more so than of the suprarenal body.

On the nature, function, and therapeutic uses of this body, a vast amount of valuable work has been done, and a short résumé of the recent literature on the subject seems at the present time to be not altogether out of place.

In several recent papers—more particularly those by Italian and German authors—very full and lengthy references and tables of the literature in various directions of the subject have been given, and the present paper is restricted more especially to the physiology and pathology of the gland as bearing on the relation between the changes found in it and the morbid process affecting the subject.

That the cortex and medulla of the gland are developmentally of totally different origin is, at the present day, generally accepted by the great majority of authors, investigations going to show that the former is of epithelial development from both sides of the Wolffian body (1), while the latter has been conclusively shown to be derived from the sympathetic nervous system (2), (3), (4), (5), (6). Researches in comparative

anatomy have gone far to furnish conclusive evidence of this, and in selachian fish the two separate bodies, the interrenal and the suprarenal body, are found to be homologous respectively with the cortex and medulla of the human suprarenal; in all other vertebrates, except fish, the two elements of the suprarenal body being closely connected together. Abundant evidence is forthcoming to show that the parenchymatous medullary cells do not form a single definite specialised group in the suprarenal, but that they form part of a larger system of tissue cells, found not only there but also in other parts of the body. They are recognisable by their peculiar reaction when treated with the salts of chromium, and have consequently been termed chromaffine cells, while the somewhat widespread distribution of these cells becomes exceedingly important when considering their function in the body.

Considerable importance is attached by many observers to the presence and nature of the fatty globules which occur in the cells of the cortex—more particularly in those of the zona fasciculata and, to a lesser extent, in those of the zona glomerulosa. By chemical and histological tests it has been proved that, in addition to the presence of ordinary fat, there is also present a phosphorus-containing fat, probably lecithin (7), (8), (9), (10), (11), (12).

In a very large proportion of all cases examined it is found that accessory suprarenals occur, these bodies consisting almost always only of cortical tissue, and varying in size from a pin-head to a pea.

Since the time of the publication of Addison's (13) work on the subject of the suprarenal organs and the consequent general recognition of their importance, very numerous researches and experiments have been undertaken, with a view to determine their function and method of action.

The earlier experiments appeared to show that these organs are essential to the life of the animal (14), and although this statement was contradicted by many observers, and for a time a somewhat keen controversy took place on the subject, it was afterwards fully corroborated (15), (16).

As regards the manner of action of the body, Brown-Séquard (17), Abelous and Langlois (18), Marino-Zucco (19), and Suppino (20), having found that removal of the suprarenals produced

a poisonous condition of the blood, came to the conclusion that these organs act as neutralising organs. On the other hand, Oliver and Schäfer (21), after experiments on various animals with an extract of the suprarenal, show that these bodies elaborate an internal secretion which maintains the physiologic tone of all muscular tissues. According to this latter view, the theory of the neutralising action may be dispensed with, as loss of the physiologic tonic influence would serve as explanation.

Pettit (22) and numerous other observers have drawn attention to the internal secretion of the organ, and it has been found that removal of one suprarenal body is followed by very marked compensatory hypertrophy of the remaining one (23); and not only so, but in cases where both organs are removed and the animal lives, it is found that great hypertrophy of the accessory suprarenals has taken place (24).

The nature of the secretion and the exact site of its formation have been the subject of a vast number of investigations.

Oliver and Schäfer (25) have proved the medulla to be the essential part of the organ. With this view Cristiani (26) is in agreement, while according to Ciaccio (27) and Levi della Vida (28) the medulla has a physiological action which is always exerted in the normal state on non-striped muscles, more particularly on the vessels, while the cortex becomes active in pathological conditions in the attempt to destroy or neutralise noxious substances in the body.

Karakascheff (29), in direct opposition to the views of Oliver and Schäfer and Cristiani, maintains that the cortex is the essential part of the organ, and quotes cases of Monti, Roloff, Hausemann, and Baucke, as supporting this opinion, but brings forward no conclusive evidence.

In connection with a possible secretion from the cortex, much stress has been laid on the presence and character of the fat in it.

Bernard, Bigart, and Labbé (30) consider that the large amount of lecithin found in the cortex is to be explained by the fact that this substance is not simply deposited there, but is produced by active secretion of the cells. Tiberti and Giacomini (31) agree with this view, while Federici (32), after experiments on guinea-pigs, comes to the same conclusion. In guinea-pigs fed on fat coloured with sudan, Federici found that

no coloured fat was deposited in the suprarenals; while the fat in the suprarenals of guinea-pigs killed after suffering starvation, was found to be as plentiful as in the normal control animal, although there was no fat elsewhere in the body.

As regards the action of suprarenal secretion, all investigators come to the conclusion that it raises blood-pressure [Oliver and Schäfer (33), Kohn (34), Biedl and Wiesel (35), Cybulski (36)], and this rise in blood-pressure has been proved to be due to a peripheral action upon the heart and blood-vessels.

In addition to this general effect on systemic blood-vessels, Brodie and Dixon (37) note an important point. While agreeing that adrenalin excites constriction by acting on nerve endings, they demonstrate that pulmonary arterioles possess no vaso-motor nerve supply, and actually find that, by the use of this agent, dilatation of these vessels is produced.

Hypoplasia of the suprarenal bodies has been found to occur only in cases where there is also absence of portions of the anterior cerebral lobes. Bender and Léri (38) refer to this fact and cite three cases of anencephaly with atrophy of the suprarenals.

In old persons the organs are not inferior in weight to those of adults (39), and the parenchymal cells, though very old, are yet able to accomplish their normal function.

In old age and in the adult, hæmorrhages in the suprarenal are much less common than in youth (40). When they exist, they usually originate in the deepest layers of the cortex, and more especially in the very vascular zone connecting cortex and medulla.

Fleischer and Penzoldt (41) have noted the occurrence of such hæmorrhage in leucocythæmia, and Ribadeau-Dumas and Bing (42) report two cases of measles in which huge hæmorrhages were found destroying the tissue in both suprarenals.

Many observers have noted the effect on these organs of experimental poisonings.

Bernard and Bigart (43), dealing with male guinea-pigs, have recorded the results of poisoning with arsenic and mercury, and state that while the medulla shows no recognisable change whatever in its substance, the cortex, however, shows a reaction in all its layers. By this reaction of cortical cells, the separation between the zones becomes indistinct, as the cells of the

various layers take on characteristics of other layers. Blood changes were also noted, varying in degree according to the intensity of the intoxication. Congestion most readily occurs in the vascular zone between cortex and medulla, and when more marked extends outwards to the outer layers of zona fasciculata, which are also exceedingly vascular. In severe acute cases, hæmorrhages occurred in the zona reticularis; while in less severe and more prolonged cases, lymphocytosis was observed in the medulla and zona reticularis, and in very prolonged cases the commencement of fibrosis was observed.

Gouget (44) found, in the case of a guinea-pig which he had treated for a month with large doses of lead, that the suprarenal bodies were more than double their ordinary volume.

Bardier and Bonne (45), studying the effect of muscular exercise on the suprarenals, conclude that they react to it by an exaggeration of their normal activity—this being more particularly manifested in the "zone spongieuse."

Bernard, Bigart, and Labbé (46) also note this relation between muscular work and the amount of fat present in the cortex. In their experiments they caused fatigue in guinea-pigs by stimulating their muscles with weak faradic currents—the animals dying in about one and a half hours. Examination of the cortex showed the ordinary fat (*la graisse indélébile*) to be normal in amount, while the amount of lecithin (*la graisse labile*) was greatly increased, the only part of the organ affected by this excessive muscular activity being the fat-containing layer of the cortex.

Marchetti (47) concludes that fatty infiltration of the cortex of the gland occurs in pulmonary diseases, heart and vessel affections, acute infections and in marasmic and cachectic conditions. He finds that accessory suprarenals are always much less affected than the organ itself, and may even be normal in cases where the latter shows evidence of very definite lesions.

Oppenheim (48), experimenting on guinea-pigs, comes to the conclusion that animals which had previously been subjected to removal of one suprarenal, withstand with greater success than normal animals the inoculation of diphtheria bacilli, and he explains this by saying, "la résistance plus grande de

l'animal partiellement decapsulé s'explique par l'action antitoxique plus puissante de la surrénale laissée en place."

Oppenheim and Loeper (49), also using guinea-pigs, record the following facts as regards changes found in the suprarenals after inoculation of the animals with diphtheria bacilli and pneumococci. In the case of diphtheria infection, they found congestion and hæmorrhages, diapedesis of polynuclear leucocytes in the zona fasciculata and at the junction of zona fasciculata and zona glomerulosa, and cellular lesions of all degrees up to actual necrosis, specially marked in zona reticularis and zona fasciculata. The lesions varied according to the intensity of the infection and were least marked in the cases of those animals which survived longest.

In this last point the authors differ from Charrin and Langlois (50), who found the most marked lesions in the slighter infections. As regards the effects produced by injection of pneumococci, they found no marked cellular lesions but very frequently hæmorrhages. These hæmorrhages originated in the central part of the gland and spared the outer part of the cortex. As in the case of diphtheria, so here it was found that the most marked lesions occurred in the animals most acutely affected. Further observations were made by the same authors in cases of human subjects, and they conclude that the chief lesions found in the suprarenals following death from infective processes are :—

1. Changes in the cellular protoplasm extending to actual necrosis and most marked in cases of pure diphtheria ; dilatation of capillaries and hæmorrhages, varying in size from a microscopic lesion to complete destruction of the gland.

2. Thrombosis of veins with production of septic infarcts.

3. Microscopic abscesses of polynuclear cells, occurring in the central part of the gland.

4. Old-standing organised lesions in chronic cases.

Federici (51), in a long and careful paper, states the results of his experiments on rabbits and guinea-pigs. In a first group of experiments he studied the lesions produced in the suprarenals in the course of acute infections produced by the inoculation (under skin of thigh or into peritoneal cavity) of very virulent bacteria, viz., pneumococci, bacillus typhosus, bacillus coli, staphylococcus aureus, streptococcus, bacillus

diphtheriæ. In such cases he found very marked hyperæmia, and in the most acute cases large hæmorrhages, both in cortex and medulla. As regards the cells, the lesions found varied according as the examination was made early or late in the course of the illness. In both cases they affect more the cortex than the medulla, and more especially the zona glomerulosa and zona fasciculata than the zona reticularis. In the early stage there was cloudy swelling, while later there were apparent areas of cell necrosis as well. Secondly, studying the effects produced in chronic processes, he inoculated attenuated micro-organisms (pyogenic cocci, bacillus typhosus, tubercle bacillus), the inoculations being repeated at intervals, so as to produce a progressive cachexia, the animal dying in from 5 to 8 weeks. In these cases he found considerably less congestion, and hæmorrhages were rare, and when present only small. Many of the cells were quite normal, while others showed cloudy swelling, and here and there in the cortex were areas of necrotic tissue. More especially in the cortex there was great increase of connective tissue, all the septa appearing denser and thicker. In many places in these thickened septa there were noted areas of small cell infiltration and many young connective tissue cells were also seen.

In tubercular cases where the process was acute, there was noted less tendency to hæmorrhage than in the acute form of other infections, a more numerous occurrence in the connective tissue of foci of small cell infiltration, and the characteristic appearance of the early tubercle when it occurred in the organ, In chronic tubercular cases the appearances differed according to the site of inoculation. When the inoculation was made at a distance from the abdominal cavity, the lesions differed only slightly from those observed in other chronic infections, though there seemed to be a greater tendency to sclerosis of the organ and the walls of the vessels appeared thickened in many places, but nowhere was any amyloid degeneration to be made out. In cases inoculated in the peritoneum or where there was general tubercular invasion of all the abdominal organs, the suprarenals showed characteristic tubercular lesions. Numerous tubercles of various sizes and in various stages of growth were present in them, and in addition to still normal tissue, there were large areas of caseous substance and cells in various

stages of degeneration. Judging by the results of these experiments, Federici considers that "le capsule surrenali si fanno sede de processi tubercolari o per propagazione diretta da organi vicini ammalati, o allorquando i microrganismi trasportati dal torrente circolatorio sono in quantità tale da provocare una rapida e simultanea deposizione di tubercoli in tutti i principali organi dell' economia. Quindi nessuna particolare predisposizione ad ammalare di fronte al bacillo di Koch." (The suprarenal capsules become the seat of the tubercular process either by direct spread from neighbouring affected organs or when the micro-organisms circulating in the blood are in sufficient quantity to produce a rapid and simultaneous deposit of tubercle in all the main organs of the body. Hence these capsules show no special predisposition to become affected by Koch's bacillus.)

These experimental results are somewhat in contradiction with those found in human pathology, where frequently, in cases of Addison's disease, it has been found that the tubercular lesion of the suprarenal was the only localisation of the tubercle bacillus in the body, or else, that it was secondary to other small foci already healed by fibrosis and calcification.

Federici further sought to discover whether these lesions occurring in the suprarenal in cases of acute and chronic infections were due to toxines, or to the local action of micro-organisms themselves. He found micro-organisms in these organs, but not otherwise, and therefore considers that the suprarenals have no special tendency to take up organisms, but that the lesions noted are due to toxines in the circulation.

In conclusion he says, "Concludendo, le capsule surrenali nel decorso delle malattie infettive sperimentali vengono precocemente ed in modo quasi constante colpite, tali lesioni, pur non essendo per le capsule surrenali dimostrato con sicurezza uno speciale ufficio di difesa pur monostante sono di per sè stesse capaci, aggravando singolarmente il quadro morboso, di accelerare l'esito letale." (To conclude, the suprarenal capsules in the course of experimental infective processes become early affected and in a manner almost always similar, and although it cannot be shown with any degree of certainty that these organs possess special defensive properties, nevertheless the lesions occurring in them are, by distinctly aggravating the

condition, themselves capable of accelerating the fatal termination.)

From the foregoing, it would not appear that histologically any marked special reaction in the gland to infective processes is observable. In acute virulent affections there are found acute vascular and cellular changes; in chronic affections, more long-standing changes; while the theory of the secretion of lecithin by cortical cells is so far utterly unproved.

That the subject is capable of further extension is, however, undoubted, and it seems probable that, by close examination of these organs in a large number of human subjects, further light may be thrown on their reaction to morbid processes and connection with clinical symptoms.

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A CLINICAL STUDY OF INFLUENZA IN THE EPIDEMIC, 1904-5[1]

By MICHAEL DEWAR, M.D.

THE notes which I propose submitting to the Society are the results of some observations made during the recent epidemic of influenza in the city—the cases occurring in my practice towards the end of 1904 and in the beginning of 1905. A good deal has been written about the disease by various observers during the last century, and the descriptions of the disease have been much the same by both ancient and recent

[1] Read before the Medico-Chirurgical Society of Edinburgh.

writers. The first visitation of influenza to this country, of which there is a trustworthy account, was that of 1510. There are records of several epidemics since that date. One, which occurred in 1732, spread in a progressive manner over the whole of Europe and part of America. A second in 1785, and a third in 1803 invaded the whole of Great Britain. Again, in 1847, the disease attacked and spread (according to Dr Southwood Smith) in a single day over every part of London, and affected upwards of half a million people. When the disease prevailed pandemically or epidemically in this manner, the physicians called it influenza, and even at that day they believed that the disease depended on a specific contagion. That the disease and its sequelæ did not strike the physicians of thirty years ago with much fear or alarm, is evidenced by the fact that my teacher, the late Professor Laycock, than whom there were few more acute observers, in his course of lectures on Medicine, merely alluded to it, and passed it over with a few words. The disease being of such a severe and protean character, and recurring epidemically, though comparatively not very fatal, is my excuse for recording the notes of some typical cases, as a small contribution to the literature of the subject.

There have been at least three epidemics in Edinburgh in recent years—one in 1889-90, a second in 1898, and a third in 1904-5—and my impressions of these epidemics, though exhibiting the same types, are that they differed on each occasion as regards the predominating type. Fifteen years ago most of the cases were of the nervous type, where the poison spent its strength on the brain and spinal cord. There were great depression of spirits, delusions, long-continued prostration, and protracted convalescence, some even ending in melancholic insanity and subsequent death. The type in that epidemic was very severe, and not a few of the victims never became the same persons as before, as regards robust physical strength and mental vigour. In fact some of them became perfect wrecks. In the epidemic of 1898, seven years ago, the cardiac and pulmonary type predominated, occurring chiefly among middle-aged and elderly people of both sexes. These cases were again distinguished by protracted illness and slow convalescence. In both these epidemics, the children in my

practice at least escaped with very few exceptions. In the recent epidemic I have carefully selected those cases which to my mind were undoubted examples of influenza, about fifty in number, leaving out a large number which might have been classified as of the influenza type, but which, at the same time, were probably cases of simple colds and catarrhs of the various organs of the body. The method adopted in diagnosing influenza cases was one of exclusion, and perhaps that is the best way by which one can come to a correct opinion of the nature of the disease dealt with, short of having the bronchial secretion of every patient bacteriologically examined. There are the history of the case, the prodromata, the general appearance of the patient, the temperature, which I will presently allude to, and the condition of the pulse. If the examination cannot account for any peculiar symptoms which may arise during the course of the illness, I plump for influenza, and the after effects and slow convalescence, in nine cases out of ten, generally confirm the diagnosis. The majority of the cases in this epidemic of 1904-5 occurred during the thirty days from the middle of January to the middle of February. The onset of this epidemic was gradual, beginning with a few cases towards the latter end of December, reaching the maximum about the end of January, and gradually tailing off towards the end of February, a period of about eight weeks.

As regards the etiology, most recent writers are agreed that the disease is due to Pfeiffer's bacillus, and Leichtenstern distinguishes between true epidemic influenza, which is due to Pfeiffer's bacillus, and pseudo-influenza or catarrhal fever, commonly called the "grippe," which is a special disease, and of unknown etiology, and bearing the same relation to true influenza as cholera nostras does to Asiatic cholera. The epidemics which have come under my notice occurred at the close and beginning of the year. The manifestations of the disease are very varied, and this is probably due to the various temperaments and idiosyncrasies of the subjects.

On examining the cases of the recent epidemic, three principal types were noted :—

(1) The Cardiac and Pulmonary.

(2) The Gastro-Intestinal.

(3) The Nervous or Neurotic ;

and though each of the cases presented symptoms common to all, yet the predominating symptoms of each were sufficiently well marked to enable me to classify them into these three types. As has already been mentioned, the chief difficulty was in the diagnosis, but after careful consideration of the manner of onset, inability to discover lesions which would give rise to the symptoms produced, the temperatures in the different types, the facial expression which was typical in most of the cases, not easily described, but easily seen, the erratic pulse, and the dry, brownish tongue, almost resembling a typhoid tongue without the sordes, generally enabled me to come to a definite decision. In the text-books the descriptions of the symptoms generally begin with conjunctival and nasal catarrhs, but I must say that I observed this catarrh only in a very few cases.

Practitioners would do well, therefore, not to be misled in their diagnosis of these cases by the absence of coryza.

In the cardiac and pulmonary type, both sexes of adults and children were the victims. There were the usual symptoms of a fever—frontal headache, shivering, flushed face, and a general feeling of illness. The temperature in the cardiac cases varied for the first two or three days from 99° to 102.5° F.; then for about a week registered 99° and 100°; and afterwards, according to the nature and extent of the complications, became normal in the course of another week. The heart became feeble and irregular in its action, with sometimes a faint blowing mitral systolic murmur, and the pulse was quick, soft, and compressible. There was usually some dry cough. In the pulmonary cases the complication was usually of a bronchial character, with pain in the mid-chest, cough with frothy sputum, and of course a higher temperature among children, up to 104° and upwards. That those cases were of a toxic character, and not merely uncomplicated carditis or bronchitis, was shown by the temperature, which far exceeded that which would have been produced by the comparatively small amount of cardiac or bronchial lesions present.

A typical case was that of C. M., female, aged 9, who became ill on the 30th January during the afternoon, with a very sudden onset, complaining of severe headache, feverishness, pains in the chest wall and shoulders. I saw her about

11.30 the same evening, and found her looking very ill, with a temperature of 104.5°, and a sharp rapid pulse, 140. She had vomited a little earlier in the evening. On examining the chest, nothing was found abnormal. There was puerile breathing over the chest, front and back, and no moist sounds. Respiration 20, no cardiac murmurs, and no albumen. She complained of a pain in the stomach, then under the left arm, and again over the right shoulder. There was no rash—no diarrhœa—and the tongue was dry and brown, with a darker band down each side. The temperature for the next few days varied between 100° and 104.5°, not the usual swinging temperature, but very irregular, sometimes 104° in the morning and 100° in the evening, and *vice versâ*. After four days there was slight harsh breathing, with some indistinct moist sounds over the upper part of the lower lobe of the left lung behind, and some cough with very little sputum. The flitting pains continued here and there for the next ten days, with the temperature as before. About the sixteenth day the tongue became red and moist—the temperature began to fall to 99° and 100°, with an occasional leap to 103° and 104° for a few hours, and by the twenty-first day the temperature remained normal, and the child began to feel better, and, like children, wanted up out of bed. She remained very feeble for another week. A fortnight afterwards she was fairly well and strong, but easily tired.

The second type, the gastro-intestinal of varying intensity, was most observed among children, though there were a few male adults who also suffered from this form. The prominent symptoms were abdominal pain and diarrhœa coming on four or five days after the onset. The following notes will illustrate this type.

D. D., male, aged 8 years, was seen on the 25th January at 8 P.M. He was complaining of pain in the left ear, with a little purulent discharge. He had measles four weeks before. The temperature was 104.2 F. Pulse 130. There was no rash or sore throat. On the next day the morning temperature was 100.4°. Pulse 120. He was then complaining of a pain in the right hypogastrium, just under the liver, and over the right shoulder (these two symptoms being very characteristic of this type), and a slight cough. Some rhonchi were detected

in both sides of the chest behind. The bowels were free but not loose. In the evening the temperature was 99.4° F., and pulse 120. On the 27th the temperature was 104.6° F., and pulse 140 in the morning. He was not complaining of any pain at the time of visit, but it was reported that he had had a very restless night. Evening temperature, 99.4° F.; pulse 130. He was again complaining of pain over the region of the liver and in right shoulder.

On the 28th the morning temperature was 102.6° F., and pulse 130, no change. Evening temperature, 105.2° F., and pulse 140. On the 29th Dr John Thomson saw the boy with me, and after a minute examination agreed with me that it was a case of influenza, and nothing else. Temperature at 1 P.M., 99.2°; pulse 120. Evening temperature, 104.4° F., and pulse 140. 30th—Morning temperature, 102.6° F., and pulse 130. Diarrhœa had commenced during the night, the stools being of a dirty greyish green colour, with little green masses scattered through it, just like small discs of sulphate of iron. There were eight evacuations in the first twenty-four hours. Evening temperature, 103.2° F.; pulse 136; stools of same character. During the following five days there was very little change, the temperature varying between 99.6° and 102.6°, with the pulse 78 to 130. The stools gradually became more like peasoup, and still very loose.

5th February.—Temperature, 98.4°; pulse 74; feeling very well. Bowels only once in twenty-four hours, but loose; no pains, chest clear.

6th February.—Temperature 98.4°, pulse 74; doing well. Stools more natural, and slightly formed. From the 7th onward convalescence was uninterrupted.

The third type—that in which the nervous system bore the brunt of the attack—was of an entirely different character from the two preceding types, and was almost confined to adults of both sexes, nearly equally. Here the predominating symptoms were intense and confused: frontal and bi-parietal headache, sometimes preceded by nasal and conjunctival catarrh, and as often as not, pains over the body generally, chiefly in the lumbar region, great depression of spirits, and a feeling of all-goneness. In this group the temperature never exceeded 103.5°, and after the third or fourth day had a rapid drop to

the subnormal—in many cases 97° and 96.5° F. This subnormal temperature continued without rise, morning or evening, as a rule for a week to ten days. During this period some of the patients of an asthenic type looked very ill, and were very ill, and then gradually, as the temperature rose to the normal, began to improve, though feeling very languid and depressed. The pulse after the fourth or fifth day became very slow, soft, and compressible. This type was very similar to the cases met with in the epidemic of 1889-90. Some of those patients, as has already been said, became absolute wrecks, and even after a long convalescence never did much, if any good, but passed into a condition of ill-health, and died within a year or two afterwards. This type of influenza is the one most to be dreaded, even though it does not present during the acute stage any of the violent and painful manifestations of the other types, as it is quite impossible to foretell what amount of degeneration of nerve cells will be likely to take place. Fortunately, the majority of those cases recover slowly under suitable treatment, and become themselves again with perhaps somewhat diminished vigour for a time; while the minority either become confirmed invalids, out of which condition they are unable to pull themselves, and live for a year or so a miserable existence, or they succumb from exhaustion or heart failure after a few weeks.

A short account of a very striking instance of a combination of the three types may not be uninteresting:—

M. M., a married female—no children—aged 63 years, was attacked by influenza about the 10th January. She developed a well-marked dry pleurisy of the right side on the 17th, and a pneumonic extension of the lower lobe of the right lung on the 23rd. The case went on fairly well till the 13th February, when she had a slight rigor, with considerable pain on the right side. This was probably due to the pneumonic products becoming septic. On the 14th February I had the advantage of Dr Bramwell's advice in the case. After this date the progress was very unsatisfactory. Cough troubled her frequently, and the heart's action became rapid and at times irregular. She became very melancholic and low-spirited, had frequent headaches, and a few days afterwards gastric and intestinal symptoms developed. In spite of excellent nursing, she

gradually became weaker till the 15th March, when she apparently looked as if she was going to get better, but, suddenly, failure of the heart's action in the early morning of the 20th March closed the scene. This was the only death in my series of cases in the epidemic.

Prognosis.—The prognosis of the first two types may be considered generally good, if the subjects are of good constitution and in fairly good health when attacked. The majority of those cases in this epidemic were chiefly young adults and children, and recovery, though somewhat protracted, is to be looked for. The third type occurred mostly among elderly adults, and, occasionally, the aged, when of course the chances of a good recovery are not so bright. In estimating the prognosis, in order to give a fair idea to the friends as to the results, one must make sure, as far as one can, that it is a case of true influenza that is being dealt with, and not a simple catarrhal fever. It need hardly be added that true inflammatory condition of the various organs of the body should not be confounded with the disease.

Treatment.—The treatment is the part of my paper which I approach with most diffidence. It is difficult to say what is the best treatment, as different men use different remedies, but, if the results prove satisfactory, it is of no great consequence what line of treatment is taken. The main thing is to have good nursing, which includes dieting and regimen, and to combat complications as they arise. My own use of drugs varies as the cases vary. At the beginning of the disease I am in the habit of employing salicylicate of soda with or without chloric ether, or the ammoniated tincture of quinine, or an ordinary acetate of ammonia mixture, allaying headaches with phenacetin or antikamnia, while meeting complications with suitable remedies. In nearly all cases the condition of the heart must be carefully watched, using digitalis and strychnine at not *too late* a period. Added to this, careful and constant feeding, night and day, must be carried out, and nature generally will do the rest.

In conclusion, I would like to draw the attention of the Society to the following points:—

(1) That those epidemics of influenza (though individual

cases are always with us less or more) have been recurring pretty regularly every seven or eight years.

(2) That they always occur in the winter season, from the beginning of December to the end of February.

(3) That the period covers eight to ten weeks.

(4) That coryza, nasal and conjunctival, ushered in the disease in only a small proportion of the cases, being absent in the majority of those which came under my notice.

(5) That in the gastro-intestinal forms of the recent epidemic a characteristic feature was invariably present, viz., a pain underneath the liver, and in the right shoulder — a symptom which I had not observed in previous epidemics.

ON THE MICROSCOPIC CHANGES IN TUBERCULIN EXANTHEMATA

By R. CRANSTON LOW, M.B., Ch.B., M.R.C.P. (M'Cunn Scholar), Formerly Clinical Assistant, Skin Department, Royal Infirmary

THE occurrence of a more or less generalised eruption after the administration of tuberculin always raises the interesting question as to its exact nature. Recently I have had the opportunity, through the kindness of Dr Klingmüller, of examining microscopically the skin in three cases of tuberculin exanthem which occurred in the Breslau Hospital. The following is an account of the cases :—

CASE I. M. S., schoolgirl, aged 14, was admitted suffering from tuberculosis cutis verrucosa of back of foot and toes of right side. The disease had lasted eight years and had been previously under treatment, and showed slight cicatricial changes at places. The patient was pale, and the general nutrition not very good. The apex of right lung was slightly dull on percussion, with harsh breathing, but there were no signs of any active disease. On February 24, $\frac{1}{10}$ mgm. tuberculin (Koch's old tuberculin) was administered. Next day patient showed a well-marked general reaction, with a temperature of 39° C., but no local reaction in the diseased area on the foot. There also occurred a generalised eruption on the trunk and limbs. The eruption on the trunk consisted

of small, slightly red, raised papules closely crowded together. On the extremities, papules were also to be seen, but were not so closely crowded together as on the trunk, and the majority of them were hæmorrhagic in nature. The eruption on the trunk became paler and less evident after twenty-four hours. On February 27, $\frac{1}{5}$ mgm. tuberculin was given, and next day produced a slight local reaction on the foot. The exanthem again became more distinct and of same characters as at first, with this exception, that no further hæmorrhages occurred. There was a slight rise of temperature to 38.4° C. March 1, 1 mgm. tuberculin produced a marked local reaction, and also a marked general reaction, with a temperature of 40.2°. The exanthem also became more diffuse, lost its papular character, and showed marked branny desquamation, especially on the trunk. The redness of the eruption faded after two days, but the desquamation persisted for a week, and disappeared, leaving the skin a slightly brown colour. A small piece of skin was excised from the back two days after the third injection of tuberculin. It was fixed in Müller-formol solution, hardened in alcohol, embedded in paraffin, and sections cut in series and stained in different ways. Microscopically it shows the following changes. The epidermis shows slight hyperkeratosis, and except for a few wandering cells here and there between the cells of the rete Malpighii, shows no changes. But in the corium there are widespread changes. Around all blood-vessels is a marked cell infiltration, so that the course of the vessels is distinctly marked out. This infiltration is more marked around the vessels of the papillary layer than around the deeper vessels. It consists of small round cells and a considerable number of mast cells. The vessel walls show no changes. But marked changes are also to be seen in relation to the follicles. Around the follicles generally at the level of the neck of the sebaceous glands there are larger collections of cells. Here the collections consist of small round cells and mast cells, and in addition epithelioid, and in a few instances giant cells. The epithelioid and giant cells lie towards the centre of these foci. There are no signs of degeneration in the foci. The elastic fibres are partially destroyed in these areas. Around the sweat glands is also a slight cell infiltration of the same nature as around the blood-vessels without

giant or epithelioid cells. The superficial lymphatics show marked dilatation. Several of these larger foci were examined for tubercle bacilli with negative result.

CASE II. F. S. suffered from lupus vulgaris of left forearm and back and fingers of right hand. Jan. 25, $\frac{1}{10}$ mgm. tuberculin administered. This produced a slight rise of temperature, but no local reaction. Jan. 27, 1 mgm. tuberculin caused a temperature of 38° C. and a marked local reaction in all the diseased areas. All over trunk and slightly also on upper arms and thighs a slightly raised red papular eruption occurred, with a more or less follicular distribution. The papules resembled those of lichen scrofulosorum, except that they were somewhat redder, and faded after about thirty-six hours, leaving no trace. A week after the injection a piece of skin was excised from the right side in the mid-axillary line, where the papules had been very numerous. It was examined as in the first case, and shows similarly cell infiltration around all blood-vessels, sweat glands and follicles. In this case the infiltration consists of small round cells, mast cells, a few epithelioid cells, but no giant cells are to be seen.

CASE III. K. G., age 26, suffered from scrofuloderma on nose and submaxillary region. Otherwise the skin appeared normal. After $\frac{1}{10}$ mgm. tuberculin, patient showed a local and general reaction, the temperature rising to 40.2° C. Here and there over back, front, and sides of trunk and upper part of thighs there appeared scattered reddish areas, consisting of groups of papules. These papules were pale reddish in colour, corresponded to the follicles, were raised above the surface, and covered with a minute scale. In a few areas these papules gradually disappeared, but the majority remained unchanged, except that, after a few days, they became less red in colour and more scaly. After three weeks they were still unaltered. On the second day after the injection, a group of these papules was excised from the right side of thorax. Microscopically these also show changes in the epidermis and corium similar to those seen in the first case, but slightly more marked. The collections of cells are more numerous and contain more epithelioid and giant cells. The giant cells and epithelioid

cells are only seen in relation to the follicles, the infiltration around the blood-vessels and sweat glands consisting only of small round cells and mast cells. In this case there is more destruction of the elastic fibres where foci are present, but no tubercle bacilli were to be found.

The microscopic appearances of these three cases therefore shows that in the tuberculin exanthem there are widespread cellular changes, and changes which are equally marked whether the eruption is transient or persistent. The changes are so marked that one naturally doubts whether they could have been produced by the tuberculin, and whether they did not exist before, and were only made evident by the administration of the tuberculin. The third case differs from the other two in the persistence of the eruption. In that case, both clinically in the distribution and arrangement of the papules in groups and microscopically, the condition is indistinguishable from lichen scrofulosorum. The cause of these exanthemata is still a matter of doubt. Are they due to the toxines of the tubercle bacilli or to the actual presence of tubercle bacilli themselves in the tissues? Against their being due to toxines is the fact that neither lichen scrofulosorum nor such exanthemata occur in cases of advanced tuberculosis, *e.g.* advanced phthisis, where one would expect abundant toxines to be circulating in the blood. The fact that tubercle bacilli were not found has not much weight, as in some undoubtedly tuberculous conditions the bacilli are in such small numbers that they are often very difficult to find. In lichen scrofulosorum, as a rule, no tubercle bacilli are to be found, but a few authors (Wolff, Jacobi, Haushalter, Bettmann) have reported cases where bacilli were present. It is therefore possible that in these tuberculin exanthemata bacilli also are occasionally present. In conclusion, therefore, from the microscopic findings and clinical appearances, these tuberculin rashes must be considered as very closely allied to lichen scrofulosorum.

Births and Deaths registered in Eight of the Principal Towns of Scotland during July 1905

DURING the month of July 1905 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4298 living children, of whom 2190 were males and 2108 females. These births are equivalent to an annual birth-rate of 28.9 per thousand of the estimated population of these towns, a rate which is 1.8 less than that for June, but 0.8 more than that for July 1904. The birth-rate for the month was highest in Greenock, 32.5, and lowest in Edinburgh, 23.1. In Paisley it was 31.7; in Dundee, 31.2; in Leith, 31.2; in Glasgow, 30.1; in Aberdeen, 29.0; and in Perth, 27.2.

Of the 4298 children born, 290, or 6.7 per cent., were illegitimate. This illegitimate rate was highest in Aberdeen, 9.7, and lowest in Leith, 3.7. In Dundee, it was 9.2; in Glasgow, 6.6; in Paisley, 6.1; in Greenock, 5.7; in Edinburgh, 5.5; and in Perth, 5.1.

Deaths registered during the month numbered 2194, of which 1095 were of males and 1099 of females. The equivalent annual death-rate is 14.8, a rate which is 1.3 less than that for June, but 0.3 more than that for July 1904. The actual number of deaths is 114 fewer than in June, but 67 more than in July 1904. The death-rate for the month ranged from 17.6 in Perth to 10.3 in Leith. In Greenock it was 17.1; in Edinburgh, 15.8; in Paisley, 15.8; in Glasgow, 14.9; in Dundee, 14.8; and in Aberdeen, 12.2. In Edinburgh this rate was higher than that for June; in all the other towns it was lower than for that month.

Of the 2194 deaths, 771, or 35.1 per cent., were of children of less than five years old; and 516, or 23.5 per cent., of persons of over sixty. Compared to the deaths in June those of children of under five are 5 fewer, and those of persons of over sixty 10 fewer.

Deaths of children of under one year old numbered 471; this is equivalent to an infantile mortality of 112 per thousand births, a rate which is 2 more than that for June and 11 more than that for July 1904. This rate was highest in Paisley, 135; and lowest in Aberdeen, 96. In Edinburgh it was 120; in Leith, 119; in Perth, 116; in Glasgow, 112; in Greenock, 107; and in Dundee, 99. In Glasgow, Edinburgh, and Perth this rate was lower than in June; in the remainder of these towns it was higher.

The principal epidemic diseases were the cause of 227

deaths during the month, a number which is 12 fewer than in June, but 14 more than in July 1904. The equivalent annual death-rate from these causes was 1.5 per thousand, a rate which is 0.2 less than that for June, but the same as that for July 1904. This rate was for the month highest in Perth, 4.1, and lowest in Aberdeen, 0.6. In Greenock it was 2.2; in Glasgow, 1.7; in Paisley, 1.7; in Edinburgh, 1.6; in Leith, 1.0; and in Dundee, 0.9.

There were no deaths from small-pox. Deaths from measles numbered 67, which is 17 fewer than in June, but 35 more than in July 1904. Deaths from hooping-cough numbered 84; this is 25 fewer than in June, and 8 fewer than in July 1904. Deaths from scarlet fever numbered 4; from diphtheria, 12; from enteric fever, 5: and from typhus fever, 1. Deaths from diarrhœas numbered 54, this is 34 more than in June, and 9 more than in July 1904.

Deaths from influenza numbered 5; this is 7 fewer than in June, and 1 fewer than in July 1904.

To puerperal septic infection 6 deaths were due; to malignant disease 156, of which 75 were ascribed to carcinoma, 11 to sarcoma, and 70 to cancers not otherwise defined. Deaths from heart disease numbered 205; from apoplexies, 113; from premature birth debility, 64; and from alcoholism, 9.

Deaths from pneumonia numbered 173, and constituted 7.9 per cent. of the total deaths; while those from bronchitis numbered 99, and constituted 4.5 per cent. of the total deaths. Deaths from pneumonia were 38 fewer than in June, but 12 more than in July 1904; while those from bronchitis were 4 fewer than in June, and the same number as in July 1904.

Deaths from phthisis numbered 192, and constituted 8.8 per cent. of the total deaths; these were 32 fewer than in June, and 2 fewer than in July 1904.

Editorial Notes and News

The Opsonic Power of the Blood.

MEDICAL terminology increases so rapidly nowadays that it is difficult to keep pace with the newer terms, and a medical dictionary gets out of date as rapidly as a city directory. No doubt many new terms are suggested which never come into general use, but many words which have been introduced within the last few years have undoubtedly come to stay, because their use is necessitated by advances in knowledge.

Amongst these the term opsonin is likely to become very familiar to medical readers during the next few years, in connection with researches at present being carried out which seem likely to throw an important light on our knowledge of the pathology of tuberculosis.

It has for a long time been a common article of belief that the phagocytes of different individuals differ greatly in their ability to attack and overcome the organisms of specific diseases, and that upon the differences in the phagocytes depends the varying liability of individuals to such diseases. It is doubtful whether this theory can be held any longer. Indeed so far as one very important disease is concerned it seems certain that it cannot. Some observations which Dr Wright has made upon tuberculosis have led to very important conclusions. Briefly Dr Wright believes that the blood serum or plasma contains substances which act upon tubercle bacilli in such a way as to render them a more easy prey to the phagocytes. These substances he terms opsonins, from *opsono*, I cater for, I prepare victuals for. The opsonins do not stimulate the phagocytes to greater exertion. They act directly on the bacilli, probably by entering into combination with them, so that they may be more readily devoured by the phagocytes.

Dr Wright's experiments were made by mixing together blood serum, an emulsion of tubercle bacilli, and blood corpuscles (washed in a $\frac{1}{2}$ per cent. solution of sodium citrate in normal saline), and incubating the mixture for 20 minutes. Films are then made from the mixture and stained in the usual way for tubercle bacilli. The average number of bacilli ingested by each phagocyte is found by careful counting, and is called the phagocytic index. The experiments can be varied by obtaining the serum and the corpuscles from different patients.

A most striking result of Dr Wright's observations is that the source of the corpuscles makes no difference in the results. Whether the corpuscles are taken from a healthy person or from a tubercular subject, the results are the same. On the other hand, the source of the serum may make a great difference in the number of bacilli absorbed by phagocytes.

In carrying out observations upon patients, the plan adopted has been to compare the phagocytic index of the patient with that of a healthy person. The figure obtained by dividing the former by the latter is called the opsonic index or opsonic power of the serum tested. Dr Wright's observations seem to show that in cases of tubercular infection, where there has been an active response on the part of the machinery of immunisation, the opsonic power is increased, while a decrease

may signify that this machinery is becoming exhausted, or that the individual examined has an inherent deficiency in opsonic power.

Dr Wright's observations have already received confirmation from other workers, and it is obvious that we may look forward to a further advance in our knowledge of the tubercular process in the near future.

The Chair of Obstetrics A WELL-KNOWN surgeon recently remarked to us that election to a University Chair ought to be looked upon as the equivalent of elevation to the Bench or appointment as a Bishop. Time was when these were awarded almost on the Tontine principle. Anyone, if he only lived long enough, and had played his cards well, was practically certain of attaining his ambition. But times have changed, and with the episcopal bench, and to a lesser degree with the judicial, it is now recognised that new duties require vigour and something of the energy of youth. And this is certainly no less the case in a University, especially in one where the number of students is so great as in Edinburgh. Not only must the Professor be a brilliant obstetrician, not only must he be a sound and, if possible, an attractive teacher, but he must be vigorous and energetic, and, like a Bishop, have some genius for organisation if he is to render to the University the service which it has a right to demand.

And in our opinion it has a right to demand more. The successful advocate who is raised to the bench inevitably sacrifices a large income for a less, and is it not too much for the University to expect that its Professors will regard the duties of their Chairs as the occupation of the greater part of their time. The time has gone when only the size of the room limited the number a Professor could teach, and teach, as things were then, well. Now practical work takes equal rank with systematic teaching, and the classes must be broken up into sections if our school is to hold its own with the new Universities of the South. In the earlier subjects perhaps these are quite efficiently taught by assistants, but in the final ones the student benefits so much from personal association with the professor that it seems to us only his duty to devote a large part of his time to their instruction. In this connection we welcome the separation of the subjects. We have no sympathy with the argument that Obstetrics alone will not prove sufficiently remunerative. What the University wants is professors who go in for plain living, hard thinking, and earnest teaching. And we have no doubt that the share of private work which will fall to the Professor of

Obstetrics will very handsomely increase the salary attached to the Chair.

Finally, we must express our surprise that the advertisement of the Chair contains no notice of an Age-Limit. We know very well that when the question was first raised there were conflicting views on this matter. But we thought that by now everyone had come round to see that, except for the individual, all the argument was in favour of the limit, and we hope the Curators, since they cannot alter the regulations, will exact an honourable undertaking from each candidate that he shall retire at the age of 65.

The Separation of Obstetrics and Gynæcology

THE difficulties surrounding the separation of the two subjects do not seem to grow less. One of these is the intrusion of the personal factor. Clearly the question ought to be decided on its merits alone, and yet how difficult it is to clear one's mind altogether of the effect this or that scheme may have on A, B, or C. Still it must be done: the good of the school must be placed before all other considerations. It seemed at first sight easy enough to assume that the University would appoint a lecturer on Gynæcology, and that the Managers would regard him as a professor and place wards under his charge. Were there no one available for charge of the wards that plan might have to be followed, and a third (or would it be a fourth?) grade of University lecturer established. At present some are lecturers so long as they are assistants to professors, others during their hospital term, while this new lecturer would, we assume, hold office till he was sixty-five.

The matter has naturally been much discussed, and the solution which appears to be most generally approved is that the University should appoint as lecturers on Gynæcology the two senior gynæcologists of the Royal Infirmary, on the same footing as the other University clinical lecturers. There need be no extra-mural difficulties, and we hope anyway to hear less and less of these in the future. The union of Gynæcology with Clinical Medicine is an absurd anachronism, and we think everyone agrees that it should be dissolved. The University would then have two lecturers on Gynæcology, and by a little judicious arrangement the teaching in this important subject could be enormously improved. Thus it would be possible to take small sections of the class daily, and if a little more use were made of the assistant Gynæcologists all the students could get a thorough grounding in the subject.

Further, the University would have the advantage of a

constant succession of—well—middle-aged teachers. It is very unlikely that his successor will, like Professor Simpson (and Moses), retain their eyes undimmed, their strength unabated, and go on improving as operators the older they grow; and, as these lecturers will not drain the pension fund, the University will have no interest in retaining them.

Talking the other day to an old Edinburgh man, now a professor in a Colonial University, we asked him what he thought our weak point. His answer was prompt: "Too many students, or conversely too few teachers." Here is an occasion where at no expense, no risk, no trouble, the University may double its teaching staff in one subject, greatly increase its efficiency and its students' opportunities, and we trust that the authorities will think well before they let the occasion pass.

The B.M.A. at Leicester

SOME were inclined to be pessimistic regarding the success of a meeting in so unacademic a centre as Leicester, but their forebodings were altogether unjustified. The meeting was a great success. The weather was in marked contrast to that experienced in Oxford, and all the outdoor functions went well, the Mayor's evening fête in the Park being quite a feature of the meeting. The addresses were of more than average merit, and most, if not all the sections were interesting. Perhaps the most surprising success was the pathological museum, and those who held that out of a university town it was almost useless to look for anything interesting must have willingly admitted their mistake. Of course, much is due to modern methods of mounting, and the contrast between the lifelike specimens of to-day and the "pickles" of twenty years ago is remarkable evidence of the advance of pathological methods.

Most praise has been given to the gynæcological department, and we readily admit its merits, but the other sections were almost, if not quite, as good; for instance, the photographs of groups of vaccinated and unvaccinated patients suffering from smallpox were singularly interesting—in Leicester. One exhibitor introduced a custom of indicating the identity of the patients from whom the morbid specimens had been removed. We assume that it was inadvertently done, and we hope steps will be taken to prevent any repetition of the innovation.

The representative meeting sat often and long, and got through an enormous amount of work, much of it useful. We were gratified to find that our hopes, recently expressed, that it would deal summarily with the absurd proposals for parliamentary representation were fulfilled, and the meeting contented itself

with the expression of the pious opinion that the profession should be better represented in Parliament, and left the proposals of the Council severely alone.

By a large majority the meeting empowered the Council to take the necessary steps to apply for a Royal Charter. When the discussing of the new Constitution was going on, several branches (among them the Edinburgh Branch) suggested that means of dealing with the difficulties, but it was argued that the expense would be too great. Now it turns out that unless there is great opposition this will be relatively inconsiderable, and we hope that negotiations with those societies which are contemplating opposition will be successful in bringing about an amicable arrangement. One of the features of the meeting was the story told by the Chairman who, we regret to learn, has definitely decided not to accept re-election. We have before commented on the nationality of the Presidents of the General Medical Council. The next Chairman will be even more cosmopolitan than any of these, for Dr Macdonald bears a good Scottish name, is an Irish graduate, and practises in Somersetshire. We trust that he will secure a goodly portion at least of Sir Victor Horsley's mantle.

Next year the Association will meet in Toronto in the last week of August, and in 1907 the meeting will probably be in Bradford. Thereafter it is time it came north again, and we commend the consideration of an invitation to the two Northern Universities.

Lists of Passes

UNIVERSITY OF EDINBURGH

Graduation Ceremonial

THE summer graduation ceremonial of the University of Edinburgh took place on Friday, July 28th, in the M'Ewan Hall, which was filled with graduates and onlookers. The meeting was invested with special interest and significance inasmuch as the promoter was Professor A. R. Simpson, whose address naturally took the form of a farewell. A large company followed the Vice-Chancellor on to the platform. After prayer by Professor Taylor, the Dean of the Faculty of Law (Sir Ludovic Grant) presented for the honorary degree of LL.D. Mr Horace Round, M.A., D.L., the historian.

The promoter then intimated the candidates on whom degrees

were to be conferred, and they were presented in turn to the Vice-Chancellor and capped, being introduced by Professor Cunningham, Dean of the Faculty of Medicine; Professor Geikie, Dean of the Faculty of Science; and Sir Ludovic Grant, Dean of the Faculty of Law.

Degree of Doctor of Medicine.—F. J. H. Bateman, M.A., M.B., C.M.; C. M. Begg, M.B., Ch.B.; *R. A. Belilios, M.B., Ch.B.; J. F. G. Bent, M.B., C.M.; H. E. Bower, M.B., C.M.; G. E. Bowker, M.B., C.M.; A. J. Brock, M.B., Ch.B.; *R. D. Brown, M.B., Ch.B.; †J. Burnet, M.A., M.B., Ch.B.; O. H. Chapman, M.B., C.M.; *H. L. Cumming, M.B., Ch.B.; †J. Davidson, M.B., Ch.B.; †G. A. Davies, B.A., M.A., Ch.B.; ‡W. E. C. Dickson, B.Sc., M.B., Ch.B. (with First Class Honours); †T. G. B. Dodds, M.B., Ch.B.; †H. J. Dunbar, M.B., Ch.B.; *J. M. Dupont, M.B., Ch.B.; ‡J. Eason, M.B., C.M. (with First Class Honours); ‡D. C. L. Fitzwilliams, M.B., Ch.B.; E. Frost, M.B., C.M.; *R. V. Fulton, M.B., C.M. (*in absentiâ*); R. Gibson, M.B., Ch.B.; C. F. Giddy, M.B., C.M. (*in absentiâ*); R. M'K. Grant, M.B., Ch.B.; †E. D. W. Greig (B.Sc.), M.B., C.M.; †P. S. Haldane, M.B., Ch.B.; A. A. Hall (M.A.), M.B., Ch.B. (with First Class Honours); A. R. Hallam, M.B., Ch.B.; †P. W. Hampton, M.B., Ch.B.; *R. Hardie, M.B., C.M. (*in absentiâ*); *I. K. Hermon, M.B., Ch.B.; *Alice Marion Hutchinson, M.B., Ch.B.; A. E. Hunter, M.B., Ch.B.; H. Jamieson, M.B., C.M.; *P. Jones, M.B., C.M.; *C. T. Cory, M.B., C.M.; *R. M. Leslie, M.A., B.Sc., M.B., C.M. (with First Class Honours); *W. G. Little, M.A., M.B., C.M.; R. J. M'Clelland, M.B., Ch.B.; J. C. M'Conaghey, M.B., Ch.B.; A. MacGregor, M.B., C.M.; †W. M'Lachlan, B.Sc., M.B., Ch.B.; *J. MacNidder, M.B., C.M.; J. D. Macrae, M.B., C.M. (with Second Class Honours); *G. R. Mill, M.B., Ch.B. (with Second Class Honours) (*in absentiâ*); *F. W. More, M.B., Ch.B.; *U. N. Mukerji, M.B., C.M. (*in absentiâ*); S. K. Mullick, M.B., C.M. (*in absentiâ*); C. G. Murray, M.B., C.M.; *G. S. Murray, M.B., Ch.B; *A. Nasmyth, M.B., C.M.; W. H. Nutt, M.B., Ch.B.; T. E. Nuttall, M.B., C.M.; A. H. Pirie, B.Sc., M.B., Ch.B.; Catherine Mary Richardson, M.B., Ch.B.; *R. G. Riddell, M.B., Ch.B.; *H. M. Roberts, M.B., Ch.B.; *J. K. A. Robertson, M.B., Ch.B.; *W. Robertson, M.B., C.M.; W. A. Robinson, M.A., B.Sc., M.B., Ch.B.; R. G. Robson, M.A., M.B., C.M.; *T. W. Edmondston, M.B., Ch.B. (with Second Class Honours); *W. E. Scott-Moncrieff, M.B., C.M.; J. S. Sewell, M.B., Ch.B. (with Second Class Honours); *S. R. Sibbald, M.B., Ch.B.; *G. F. B. Simpson, M.B., Ch.B.; A. B. Slater, M.B., Ch.B.; *F. S. Stanwell, M.B., C.M.; C. E. Stephens, M.B., C.M.; *D. A. Stewart, M.A., M.B., Ch.B.; A. H. Thompson, M.B., Ch.B.;

C. P. B. Wall, M.B., Ch.B. (*in absentiâ*); *W. Ward-Smith, M.B., Ch.B.; ‡B. P. Watson, M.B., Ch.B. (with First Class Honours).

‡ Awarded gold medals for their theses. † Highly commended for their theses. * Commended for their theses.

Degree of Bachelor of Medicine and Bachelor of Surgery.— T. Addis, F. Aitken, J. C. D. Allan, A. C. Alport, A. G. Anderson, M.A., B.Sc., W. Anderson, M. A. Ansari, B.A., F. Baillie, G. S. Banks, †D. M'F. Barker, J. M. Barkley, G. G. Bartholomew, B. Baty, W. J. E. Bell, N. Black, R. Bladworth, C. E. Blair, G. Blair, R. A. Blake, H. M. Brown, J. W. Cairns, T. Campbell, *H. M. Cargin (*in absentiâ*), N. S. Carmichael, J. Chisholm, H. P. Cook (*in absentiâ*), F. W. Cragg, J. G. Craig, J. A. Cruickshank, W. H. Cusack, A. Dangerfield, T. Davidson, M.A., *J. M. Dickson, M. G. Dill, D. Eakin, H. A. Edwards, E. A. Elder, M.A., B.Sc., C. E. Elliston, H. F. Fenton, F. E. Field, C. N. Finn, N. C. Forsyth, *R. S. Frew, W. G. Fröhlich, J. F. Gallaher, L. P. M. Gardner, H. S. Gaskell, W. Gemmill, M.A., E. G. Girdwood, J. A. Glover, M.A., J. M. Grant, J. Green, †Charlotte R. Greenfield, J. C. Grieve, E. J. C. Groves, J. A. Gunn, M.A., B.Sc., J. T. Gunn, G. Hadden, J. D. Harmer, Ada A. Hatchard, A. S. Hendrie, W. M. Hewetson, H. S. A. Hogg, J. S. Hogg, J. R. Holgate, J. H. Hume, J. Ings, Ada Jackson, J. P. S. Jamieson, S. E. Kark, J. R. Kerr, Ethel Landon, J. M. Lauder, Jas. Lindsay, Jno. Lindsay, A. P. G. Lorimer, J. A. Loughridge, D. H. C. MacArthur, P. M'Diarmid, †P. M'Ewan, M.A., T. A. MacGibbon, B.A., B.Sc., J. D. M'Kelvie, J. MacKenzie, K. W. Mackenzie (*in absentiâ*), M. MacKinnon, A. C. M'Master, S. M'Naughton, †C. M'Neil, M.A., N. N. G. C. M'Vean, W. M'Gill, †W. J. Maloney, S. E. Martin, E. S. Hassiah, *G. D. Matthewson, B.Sc., A. Mathieson, D. M. Mathieson, M.A., A. I. Miller, H. P. Milligan, C. E. S. Mitchell, J. S. Mitchell, C. T. Möller, H. B. Morris, D. L. Morrison, H. Mowat, R. E. Moyes, E. B. Munro, A. W. Neill, R. H. Nolan, G. P. Norman, A. J. R. O'Brien, C. R. O'Brien, A. A. Ollivierre, J. S. Orwin, D. H. Paul, J. L. Pearce, †H. E. Rawlence, D. G. Reid, A. O. P. Reynolds, W. E. Reynolds, J. R. Robertson, W. G. Robertson, M.A., W. L. Robertson, M.A., †J. Z. H. Rousseau, B.A., H. M. Sauzier, T. Scoresby-Jackson, †W. M. Scott, W. J. B. Selkirk, M.A., A. I. Shepheard-Walwyn, D. W. Sibbald, E. M. Simmers, A. Simpson, E. S. Simpson, O. Smith, S. A. Smith, T. R. Smith, A. G. V. van Someren, D. W. Standley, R. C. Standring-Smith, B.A., W. J. Taggart, W. B. Tannahill, Annie F. Theobolds, J. A. R. Thompson, E. F. Valenzia, F. L. de Verteuil (*in absentiâ*), *P. S. Vickerman, Helen R. Vickers,

Frances M. Wakefield, R. C. Walker, *H. E. A. Washbourn, H. C. Weber, J. D. Wells, F. P. Wernicke, A. Wight, Elsie B. Wilkie, R. Wilkins, H. C. Wilson, †J. Young, J. T. Young.

* Passed with First Class Honours.
† Passed with Second Class Honours.

Master of Surgery.—L. C. P. Ritchie, M.B., Ch.B. Experimental and critical researches with regard to the surgical aspects of the infectivity of the skin-gland secretions; the nature of the temporary and of the permanent skin epiphytes, and the circumstances determining their incidence and duration on the skin; and the value of lanoline employed as a protection to the skin against infection. (Highly commended for thesis.)

Bachelor of Medicine and Master in Surgery.—J. Clark, H. Downes, G. A. Grierson (Second Class Honours); R. W. Telford.

Certificates in Diseases of Tropical Climates: A. C. Alport, M.B., Ch.B.; A. G. Anderson, M.A., B.Sc., M.B., Ch.B.; M. A. Ansári, B.A., M.B., Ch.B.; F. Baillie, M.B., Ch.B.; G. S. Banks, M.B., Ch.B.; D. M'F. Barker, M.B., Ch.B.; N. Black, M.B., Ch.B.; C. E. Blair, M.B. Ch.B.; R. A. Blake, M.B., Ch.B.; H. M. Brown, M.B., Ch.B.; T. Campbell, M.B., Ch.B.; J. W. Cathles, M.B., Ch.B.; D. MacD. C. Church, M.B., Ch.B. (*in absentiâ*); J. Clark, M.B., C.M.; H. P. Cook, M.B., Ch.B. (*in absentiâ*); T. Davidson, M.B., Ch.B.; J. M. Dickson, M.B., Ch.B.; R. S. Frew, M.B., Ch.B.; L. P. M. Gardner, M.B., Ch.B.; H. C. Gibson, M.B., C.M. (*in absentiâ*); E. G. Girdwood, M.B., Ch.B.; V. R. Gorakshakar, M.B., Ch.B. (*in absentiâ*); J. C. Grieve, M.B., Ch.B.; Elizabeth C. Gunn, M.B., Ch.B. (*in absentiâ*); J. D. Harmer, M.B., Ch.B.; A. S. Hendri, M.B., Ch.B.; W. M. Hewetson, M.B., Ch.B.; H. S. A. Hogg, M.B., Ch.B.; J. S. Hogg, M.B., Ch.B.; Ada Jackson, M.B., Ch.B.; S. E. Kark, M.B., Ch.B.; J. R. Kerr, M.B., Ch.B.; Ethel Landon, M.B., Ch.B.; J. Lindsay, M.B., Ch.B.; J. A. Loughridge, M.B., Ch.B.; P. M'Ewan, M.A., M.B., Ch.B.; K. W. Mackenzie, M.B., Ch.B. (*in absentiâ*); A. C. M'Master, M.B., Ch.B.; N. N. G. C. M'Vean, M.B., Ch.B.; W. J. Maloney, M.B., Ch.B.; S. E. Martin, M.B., Ch.B.; E. S. Massiah, M.B., Ch.B.; A. Mathieson, M.B., Ch.B.; C. E. S. Mitchell, M.B., Ch.B.; E. B. Munro, M.B., Ch.B.; A. W. Neill, M.B., Ch.B.; G. P. Norman, M.B., Ch.B.; A. J. R. O'Brien, M.B., Ch.B.; A. A. Ollivierre, M.B., Ch.B.; W. E. Reynolds, M.B., Ch.B.; W. G. Robertson, M.A., M.B., Ch.B.; H. M. Sauzier, M.B., Ch.B.; W. M'D. Scott, M.B., Ch.B.; D. W. Sibbald, M.B., Ch.B.; E. S. Simpson, M.B., Ch.B.; T. R. Smith, M.B., Ch.B.; A. G. V. van Someren, M.B., Ch.B.; D. W.

Standley, M.B., Ch.B.; K. A. M. Stuart, M.B., Ch.B. (*in absentiâ*); Annie F. Theobalds, M.B., Ch.B.; J. A. R. Thompson, M.B., Ch.B.; E. F. Valenzia, M.B., Ch.B.; V. S. Valiathan, B.A., M.B., Ch.B.; F. L. de Verteuil, M.B., Ch.B. (*in absentiâ*); R. C. Walker, M.B., Ch.B.; H. C. Weber, M.B., Ch.B.; J. D. Wells, M.B., Ch.B.; F. P. Wernicke, M.B., Ch.B.; A. Wight, M.B., Ch.B.; H. C. Wilson, M.B., Ch.B.

Thesis Gold Medallists.—W. E. C. Dickson, M.D.; J. Eason, M.D.; D. Fitzwilliams, M.D.; A. A. Hall, M.D.; B. P. Watson, M.D.

The following prizes and scholarships were awarded:—The Goodsir Memorial Fellowship—D. C. L. Fitzwilliams, M.D., Ch.B. The Syme Surgical Fellowship—F. I. Dawson, M.D., Ch.B. The Milner Fothergill Medal in Therapeutics—J. Eason, M.D., C.M. The Ettles Scholarship—W. J. Maloney, M.B., Ch.B., and W. M'D. Scott, M.B., Ch.B.—equal. The Allan Fellowship in Clinical Medicine and Clinical Surgery—H. E. Rawlence, M.B., Ch.B. The Buchanan Scholarship in Gynecology—P. M'Ewan, M.A., M.B., Ch.B. The James Scott Scholarship in Midwifery—W. J. Maloney, M.B., Ch.B. The Mouat Scholarship in Practice of Physic—G. D. Mathewson, B.Sc., M.B., Ch.B. The Charles Murchison Memorial Scholarship in Clinical Medicine—J. P. M'Gowan, M.A., M.B., Ch.B. The M'Cosh Graduate's and Medical Bursaries—W. J. Maloney, M.B., Ch.B. The Beaney Prize in Anatomy and Surgery—W. M'D. Scott, M.B., Ch.B. The Conan Doyle Prize—J. Z. H. Rousseau, B.A., M.B., Ch.B. The Dorothy Gilfillan Memorial Prize—Charlotte R. Greenfield, M.B., Ch.B. The Gunning Victoria Jubilee Prize in Zoology—A. N. Bruce, B.Sc. The Wightman Prize in Clinical Medicine—C. M'Neil, M.A., M.B., Ch.B. The Pattison Prize in Clinical Surgery—F. F. S. Smith.

Royal College of Surgeons of Edinburgh

AT a meeting of the College held on 26th inst., the following gentlemen, having passed the requisite examinations, were admitted Fellows:—Lewis Beesly, L.R.C.S.E., Edinburgh; Alexander Brownlee, L.R.C.S.E., Edinburgh; Harold Branson Butler, M.R.C.S.Eng., Guildford; Duncan Macnab Callender, M.B., Ch.B., Edinburgh; Naunidh Rai Dharmavir, L.R.C.S.E., Mexborough; Augustus D'Souza, L.R.C.S.E., Edinburgh; James Ferguson Duncan, M.B., Ch.B., Edinburgh; James Forrest,

M Ch.B., Blackpool; Alfred Thomas Gavin, M.B., C.M., Dunaskin; Bharat Chandra Ghosh, L.R.C.S.E., Punjab; Frederick Charles Hitchins, M.R.C.S.Eng., St Austell, Cornwall; Matthew Holmes, M.B., Ch.B., Edinburgh; Robert James Irving, M.B., C.M., Norwich; Samuel Jesudasan, M.B., C.M., London, N.; John Arnold Jones, M.B., Ch.B., Manchester; Edwin Malcolm Lithgow, M.B., Ch.B., Edinburgh; Samuel Harvey M'Coy, M.R.C.S.Eng., St Catharine's, Ontario; John Stewart Merrillees, L.R.C.S.E., Auburn, Melbourne; John David O'Donnell, L.R.C.S.E., Mysore, India; George Benjamin Pemberton, M.B., Ch.B., Edinburgh; Charles George Webster, L.R.C.S.E., Captain, I.M.S.; and Charles Peterson Weekes, M.R.C.S.Eng., Sutton, Surrey.

The medal and set of books forming the "Bathgate Memorial Prize," presented to the College by Colonel William Lorimer Bathgate in memory of his late father, William McPhune Bathgate, Fellow of the College, was awarded to Mr Peter Gorrie, 3 Cameron Park, Edinburgh.

Edinburgh University Medical Passes

THE following is the official list of passes at the recent professional examinations for degrees in medicine and surgery:—

First Professional Examination.—D. C. Adam, David Aiken, R. J. Allsopp, Fergus Armstrong, T. H. Balfour, G. E. K. Branch (with distinction), J. A. Brown, B.A.; O. S. Bullock, J. R. Bullman, W. L. Burgess (with distinction), B. N. Burjorjee, G. L. Cawkwell, J. J. P. Charles, A. Dumas Child, W. F. Christie, Gladys H. Cook, James Crocket, J. M. Dalzell, Lucy E. Davies, R. W. Davies, W. N. Davies, Jemima B. Dickie, John K. M. Dickie, Adelaide A. Dreaper, J. W. C. Drever, William Dunlop, A. L. Dykes, J. M. Elliot, A. M. Elliot, Euphemia L. Farmer, B.A.; H. G. Feltham, W. C. Fragoso, F. R. Fraser, Mary M. Gardner, G. H. Garnett, A. W. Gill, V. H. Gordon, W. T. Graham, E. S. B. Hamilton, H. F. Hamilton, Robert Hamilton, R. C. Harkness (with distinction), John Henderson, B. J. O. Hoare, R. L. Hughes, G. R. Inglis, Flora R. Innes, Hannah M. Irving, B.Sc.; H. E. Johnson, J. V. Karve, R. R. Kerr (with distinction), G. E. King (with distinction), C. G. Kurien, J. M. Lawl, A. J. B. Leckie, Janet Leiper, H. E. A. Lemerle, W. R. Logan, Mary Low, M.A.; W. H. Lowe, R. C. Lowther, W. G. M'Afee, A. D. MacArthur, A. J. M'Connell, P. A. M'Cool, William Macdonald (with distinction), Thomas M'Fetridge, R. B. Macfie, Mary E. B. MacIlwaine, James Mackail, M.A.; William M'Kie, G. V. T. M'Michael, R. D. M.

Macpherson, C. G. Marais, T. H. R. Mathewson, William Messer, R. W. Miller, A. M. Minford, John Montgomery, J. M. Moyes, James Oag, M.A. (with distinction); J. E. R. Orchard, J. E. T. Oxley, J. J. Pace, H. F. Panton, Hugh Paterson, Ella F. Pringle, N. D. Pringle, Myfanwy D. Rees, D. G. Robertson (with distinction), James Robertson, Dermid M. Ross, William Ross, M.A.; John M. Scott, K. R. G. Shah, Kerr Simpson, J. C. Smith, M.A.; William Stevenson, C. P. A. Stranaghan, R. K. S. Sutherland, James Swan, Arthur L. Taylor, J. A. Thompson, J. G. Thomson, M.A.; W. S. Thomson, L. J. Wallis, Allan Watson, Joseph C. Watson, J. P. Whetter, Seymour Williams, John Wilson, D. W. Woodruff, G. G. Wray (with distinction), Margaret C. Young.

Second Professional Examination.—J. L. Annan, J. P. Berry. H. W. Binks, J. A. Brand, E. A. Brummitt, P. D. Cameron, W. D. Coghill, Theodore Craig, G. H. Dart, Margaret E. Davidson, C. H. Derksen, Thomas Derrick, C. A. A. Dighton, Joanna M. F. Drake, V. L. Evans, J. Letitia D. Fairfield, W. P. Ferguson, M.A., B.Sc.; Thomas Fraser, Hester M. Henderson, W. S. Heron, A. M. Hewat, Matthew Heyns, W. P. Holden, St G. M. L. Homan, Lloyd Hughes, J. A. Jamieson, H. C. Johnston, W. D. S. Johnston, A. W. Kendall, J. S. Kinross, A. F. Lee, Cecil R. Letham, H. Bruce Low, C. W. L. Lüthgen, G. J. Luyt, B.A. (with distinction); L. G. M'Cune, W. S. M'Cune, Thomas M'Ewen, R. J. A. Macmillan, D. J. M'Rae, C. J. van der Merwe, J. A. Morris, Ara G. Murchison, A. T. Paterson, O. E. Powell, Barbara Richardson, C. L. Digby Roberts, A. H. M. Robertson, R. L. Scott, Frederick Shannon, H. C. Simpson, J. T. Simson, Thomas Smyth, Alice M. Thompson, Eleanor M. Thompson, H. B. Thomson, L. R. Thomson, A. E. Turnbull, A. M. Vlok, Helen M. Wakefield, R. N. Wallace, W. C. Whiteside, G. S. Williamson, E. D. Wilmot.

Third Professional Examination.—Alfred Arthur, R. C. E. Atkinson, M.A.; R. G. A. Bagnall, C. R. M. Baker, M. M. Sujjad Beg, Mary Brown, Edward Burnet, B.A.; Richard Davidson, Pollok Donald, E. W. Dyer, J. G. Fleming, F. S. B. Fletcher, F. H. Somers Gardner, K. N. Ghosh, G. H. R. Gibson, John Gilmour, W. H. Gowans, D. K. Henderson, F. O. Inglis, S. B. Legge, J. P. Lowson, M.A.; F. J. Luck, W. O. S. M'Gowan, J. B. Mackenzie, R. P. M'Morland, George M'Mullan, W. J. Macnab, John Mathewson, M.A.; H. L. Morrow, Janet M. Murray, M.A.; A. S. Paterson, A. M'Tier Pirrie, C. S. U. Rippon, W. G. Rivers, Thomas Robertson, Æneas Rose, M.A.; Frank Ross, W. S. Stevenson, G. H. Stofberg, H. G. Sutherland, J. A. Taylor, E. W. Vaughan, A. S. Walker, F. E. Wall, R. M. Wishart, A. F. Wright.

Third Professional (New Regulations—Pathology only).—D. M. Barcroft, F. G. H. R. Black, Frank Blamire, R. D. Clayton, J. H. Lamb, John Macdonald, G. B. Macgregor, G. D. M'Ivor, Kenneth M'Murtrie, J. M. M'Phail, Jamesina J. Marr, C. J. Milne, J. E. Murray, A. J. P. Nowell, J. L. H. Paterson, H. B. Porteous, Claude Pycroft, Graham Robertson, J. M. Ross, Z. M. H. Ross, Elsie B. Saunders, Subrata Chunder Sen, W. O. Welply.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

By FRANCIS D. BOYD, *C.M.G.*, M.D., F.R.C.P.,
Assistant-Physician, Royal Infirmary

"OCCULT BLEEDING"

THE occurrence of blood in the stools which is not demonstrable either macroscopically or microscopically has been termed by Boas "occult bleeding." The sign is one of some importance from a diagnostic point of view. Every physician is familiar with the difficulty at times experienced in the differential diagnosis of early gastric carcinoma, achylia gastrica, and certain nervous affections of the digestive organs. To determine a diagnosis of carcinoma in the early stages, or to definitely exclude its presence, is obviously of primary importance if gastric surgery is to have a fair chance. This, a number of writers claim, can be done by demonstrating the presence or absence of occult bleeding. The demonstration of occult bleeding is carried out by the guaiac and aloin tests. As is well recognised, the guaiac test is inapplicable directly to the stool, for a blue colour will be struck with many substances, for example, articles of diet such as green chlorophyl containing vegetables and milk, products of secretion and tissue changes such as bile, saliva, and pus, medicinal substances such as iron and copper salts and combinations of iodine and bromine. Weber's modification of the guaiac test is therefore used. An acid ether extract of the fæces is made, and if with this extract a blue reaction is obtained the presence of hæmatin is established.

A portion of the suspected stool (2-3 grammes) is rubbed down in a small porcelain dish with 20 cc. water till com-

pletely mixed. To the mixture is added ⅓ of its volume acetic acid. To facilitate extraction the mixture is put into a separation funnel, and is shaken up with 10 cc. ether. The ether extract collects on the upper surface. If the extract is not clear a few drops of alcohol may be added to clarify. The sediment is then run off and the extract tested by (*a*) the guaiac test, (*b*) the aloin test.

(*a*) Two cc. of the extract is taken, 10 drops of freshly prepared guaiac tincture, and 10 to 20 drops old ozonic turpentine oil added. The turpentine is best added while the mixture is shaken, so that a clear mixture of guaiac and turpentine is obtained. With the presence of hæmatin an intense blue colour is struck in a few seconds, which ultimately becomes reddish violet. No doubtful colour is to be accepted as positive. Care must be taken in shaking the test-tube not to bring the skin of the fingers in contact with the mixture, as the sweat of the skin gives a fallacious positive result (Hartman). Boas and Kochman find that positive results are given by blood in a dilution of 0.0008, while Hartman ascribes even greater delicacy to the test—0.00005 dilution. Difficulty in the application of the test may arise from inefficiency of the turpentine oil. Hartman advises standing the oil in open dishes for eight weeks, by the end of which time it has become sufficiently ozonised. Kuttner advises the use of a solution of peroxide of hydrogen prepared by Munk instead of the turpentine, which he was unable to obtain sufficiently ozonised.

(*b*) The aloin test is applied much in the same way as the guaiac test, fresh tincture of aloes being used instead of the guaiac tincture. The aloin tincture should be freshly prepared by taking as much Barbadoes aloes as will lie upon the end of a knife (*Messerspitze*), and shaking till dissolved in 3-5 cc., 60 to 70 per cent. alcohol. The test gives a positive reaction in the presence of hæmatin by striking a clear red colour, quickly passing into cherry red. If water be added to the mixture when the reaction is positive, the colour deepens at the line of junction of the water and extract. If the result of the test be negative, the mixture remains yellow, but after some *hours* becomes rose red; this is not to be mistaken for a positive reaction, which should appear rapidly. Rossel speaks to the accuracy of the aloin test, which he has controlled, but a very necessary precaution seems to be the fresh preparation of the aloin tincture for every examination, for old tincture will strike a red colour without the presence of hæmatin.

It has been stated that for the demonstration of occult bleeding without the possibility of fallacy all meat must be excluded from the diet for some days before examining the stools.

Boas, Kochman, Rossel, and Weber, however, permit well-cooked meat in the diet. Schloss, who worked with policlinical material, out-patients in fact who were not under control, but were merely cautioned to partake only of well-cooked veal, supports this view, and states that if the meat be well cooked its presence in the diet will not give rise to fallacy. Hartman, however, disagrees with this conclusion. He put a number of patients on a flesh poor diet and examined the fæces with negative results. A mixed diet was then given and the fæces invariably gave a positive result. The definiteness of the reaction certainly varied. Not every stool gave a positive result, especially if the individual was having two or more stools per diem. In such cases one observation was often positive and another negative. Hartman tried different forms of animal food; even very thoroughly cooked veal gave the reaction in the stool. The same occurred with fish. He therefore concluded that a reliable demonstration of occult bleeding cannot be got unless flesh can be excluded from the diet. Nor can reliance be placed on the first few stools after flesh diet has been stopped, as traces of the previous diet may introduce fallacy. The patient, therefore, should be kept on a flesh-free diet for at least three days before making the observation.

Boas and Kochman report examinations on 257 cases of different stomach and bowel affections. These results divide themselves into three groups. In the first, blood was never found in the stools, in the second occasionally, in the third invariably. The first group includes cases of gastritis, anacida and subacida, hypersecretion, atonic dilatation, and the neuroses. To the second group, in which blood is occasionally found, belong simple ulcer, gastric or duodenal, and ulcer stenosis. To the third group, when blood is always found, belong cases of gastric carcinoma. In carcinoma a positive result was got in 65 out of 67 cases. Hartman gives results in 75 cases, with 998 stool examinations. He was never able to establish the presence of blood in the stools in cases of gastritis anacida or subacida, hyperchlorhydria, or neurosis of the stomach. In cases of ulcer ventriculi, while Boas and Kochman out of 12 cases only found blood in 5, and that after numerous examinations, Hartman was able to establish the presence of blood in all of his 26 cases. He draws attention to the importance of this observation in the explanation of cases of chronic gastric pain with anæmia, the probable cause of the anæmia being found in occult hæmorrhage from a chronic ulcer. Every practitioner is familiar with the difficulty in establishing a diagnosis between hysterical or neuræsthenic gastralgia with hyperchlorhydria and gastric ulcer. The systematic examination of the stools, Hartman

claims, will prove of the greatest value. He claims also that as a means of establishing the effects of treatment the test is of the greatest value.

Turning to carcinoma cases, Hartman gives results from 17 cases of gastric carcinoma, 3 cases of carcinoma of the gall bladder, with perforation into the intestine—in all, 259 stool examinations. In these cases the stool examination was positive in all except three. In these cases five stool examinations were made. Laparotomy proved the patients to be suffering from marked pyloric stenosis, and later, on the sectio it was proved that the pyloric stenosis was due to a scirrhous carcinoma in which there was no ulceration of the mucous membrane, and hence there was no bleeding.

In one of Hartman's cases of gastric carcinoma there was no gastric motor stasis, no lactic acid, free hydrochloric acid was present, and no tumour could be detected by palpation under chloroform. The blood test, however, was constantly positive, and determined the diagnosis of carcinoma, which was established by explanatory laparotomy. In a second case, where carcinoma of the colon was suspected and the blood test was positive, the patient felt so well that he refused the suggested operation. Three months afterwards he returned with inoperable carcinoma.

The author concludes that when with diminished hydrochloric acid secretion and good gastric motility the systematic examination of the stools gives a uniform positive result, then, even though other clinical symptoms are absent, the diagnosis of carcinoma is established and a benign affection excluded.

Schloss has carried out observations on twenty cases of gastritis anacida and achylia. Out of 187 fæces examination there were only two positive observations, and in these two there was the possibility of accidental bleeding. Schloss can therefore confirm the conclusions or Boas, Kochman, and Hartman.

From these foregoing observations one must conclude that in the demonstration of the presence or absence of occult bleeding we have a very valuable clinical sign—valuable as an aid in the differentiation of achylia or gastritis anacida from early carcinoma. To the patient the certain differentiation of the two conditions is of vital importance. Again, in the differential diagnosis of hyperchlorhydria and gastric ulcer, if Hartman's observations are correct the sign should be of great value.

The test can be applied to the vomited matter, but *not* to stomach contents obtained by the stomach tube, nor can certain conclusions be drawn from the fæces if the stomach tube has been recently used. The gastric mucosa in diseased conditions

is so friable that even a soft stomach tube may cause bleeding. After the use of the sound, therefore, accidental hæmorrhage may give rise to error.

Boas. *Deutsch. med. Wochenschr.*, 1901, No. 28, S. 315.
Weber. *Berliner klin. Wochenschr.*, 1893, No. 19, I.
Hartman. *Arch. für Verdanungskrankheiten*, Bd. x., 1904, S. 48.
Boas and Kochman. *Ibid.*, 1902, Bd. viii., S. 45.
Kuttner. *Berliner klin. Wochenschr.*, 1895, No. 7, S. 142.
Rossel. *Deutsch. Archiv. für klin. Med.*, 1903, Bd. 76, S. 505.
Weber. *Berl. klin. Wochenschr.*, 1903, No. 19.
Schloss. *Arch. für Verdanungskrankheiten*, Bd. x., 1904, S. 267.

SURGERY

By E. SCOTT CARMICHAEL, M.B., F.R.C.S.,
Assistant Surgeon, Royal Hospital for Sick Children

The Use of Spinal Anæsthesia in Surgery.—During the last year much attention has been directed by surgeons, especially on the Continent, to the subject of local anæsthesia. A large number of substances have been tried in order to find one which, while fulfilling its duty as an anæsthetic, will not produce those toxic symptoms exerted by cocaine and allied bodies in a large percentage of cases.

Important as it is to obtain such a substance for the various infiltration methods of inducing local anæsthesia, its use in the production of spinal anæsthesia must depend greatly on its low degree of toxicity.

Luke, in a recent paper in this journal, has drawn attention to "stovaine," which would appear from its mild toxic properties to supply a much felt want. Although he did not refer to its use in producing spinal analgesia, that subject was one under discussion at the recent German Congress in Berlin, and was introduced by Prof. Bier of Bonn, to whom most of the credit is due for recent investigations in this direction (*Archiv. für klinische Chirurgie*, Bd. 77).

Bier experimented with a large number of substances, and found that in stovaine, with or without adrenalin, the most satisfactory results were obtained, 102 cases being recorded by him in which it was used. Of these 102 cases, immediate bad effects were observed in eight, in seven of which vomiting was the chief symptom, the remaining case showing signs of collapse, while after symptoms were present in ten cases, in which headache and vomiting persisted, at most for two days. Other surgeons record two deaths ascribed to its use, Chaput's case dying on

the following day of coma, and Sonnenburg's ten days afterwards of meningitis, which might have been due to a septic infection, apart from the use of the anæsthetic.

Cases of severe collapse have been reported, but the addition of the suprarenal compounds tends to diminish this danger, a point which has been brought out by the researches of Dönitz, who has proved experimentally that solutions of adrenalin, paranephrin, or suprarenin diminish the poisonous action of cocaine and allied substances. Even with a mixture of cocaine and one of these compounds, however, after symptoms, for the most part mild, were observed in 75 per cent. of the cases in which it was used by Bier and others.

More recently Bier has entirely given up this mixture for that of stovaine and adrenalin, and believes it to be the best available for inducing spinal anæsthesia, and one which will retain a permanent position of use in surgery. He considers it to be indicated :—

1. In old and weakened persons, who bear it much better than a general anæsthetic, and can be fed as soon as desired afterwards.

In comparing rectal cases which have been so anæsthetised with those which have had a general anæsthetic, there is a most striking difference, the weakness and discomfort being very much less, and the mortality markedly diminished.

2. In military surgery, where operations have to be performed with little assistance.

3. In veterinary surgery Klapp and others have proved it to be of great value.

The chief disadvantages, such as trembling of the muscles in operations on the lower limbs or vomiting in radical cure of hemia, have, with the use of stovaine, almost disappeared, although in 2.3 per cent. of cases the anæsthetic fails to act. Other surgeons, such as Czerny, Sonnenburg, Silbemark, and Neugebauer testify to its value and the absence of disagreeable effects. In the Trendelenberg position Bier believes that injections should only be made when paranephrin is added, otherwise collapse is to be feared, while in laparotomies its use is contraindicated; perineal and rectal operations lend themselves best to its use.

Extirpation of the Rectum by the Combined Abdomino-perineal Method.—Gouilloud et Fayose (*Revue de Chirurgie*, Juin et Juillet 1905) record their experience of eight cases operated on by this method, seven being in women, all of whom recovered, the remaining one being a male, who died. They draw attention to the much greater mortality in males than

females, the most common cause of death being post-operative obstruction as the result of adhesions occurring between coils of small intestine and the floor of the pouch of Douglas, a condition found in their case.

The method of performing the operation is to expose the sigmoid flexure and cut it across, making an artificial anus of the upper end, and closing completely the lower end. The lower portion of the pelvic colon and rectum are thus transformed into a closed sack, the peritoneal portion of which is freely separated from above, the non-peritoneal portion being loosened and removed, along with the peritoneal part, from the peritoneum.

This method enables the surgeon to remove cancer not only high up, but also when it has invaded the pelvic connective tissue, and they have resected 35, 27, 30, 31, and 38 centimetres of intestine in this way.

They lay stress upon the fact that it is not so much the removal of the tumour that is of importance, bnt the removal of the whole organ which it affects, namely, the rectum. The operation so performed is from the beginning an aseptic operation as compared with those of Kraske, Lisfranc, and others, as it is simply the removal of a closed cyst.

They have not found it necessary to ligature both internal iliac arteries, as recommended by Giordano, although they systematically ligature the superior hæmorrhoidal artery, and their results compare favourably with those of Lisfranc in high cases. Their first case was operated upon five years ago without recurrence; two others, two years two months and fifteen months respectively. The remainder were operated upon within a year, and still remain free from recurrence.

While acknowledging the severity of the operation, they believe it to be considerably over-estimated in skilled hands. Of thirty-one cases reported by various surgeons, there have been eleven deaths and twenty cures, or a percentage mortality of 35 per cent.

Sixteen of these were women, and only one died, while of the fifteen men operated upon ten died, giving a very marked difference in the mortalities, namely, 6 per cent. in women and 66 per cent in men.

Gross gives the mortality as 8 per cent. and 88 per cent. in the two sexes, and Hartman believes that the greater severity of the operation in the male is due to the greater difficulty in detaching the rectum anteriorly from the base of the bladder, ureters, and prostate, the operation being naturally also more difficult in the male owing to the greater length and narrowness of the pelvis.

In describing the operation more fully, they differentiate four stages.

First.—A median abdominal incision and an iliac incision. Through the former the sigmoid flexure is divided, the upper end closed with forceps and dressings temporarily, and the lower end closed by two or three layers of silk sutures.

Second.—Separation of the rectum by division of its meso-rectum on either side, and ligature of the internal iliac and superior hæmorrhoidal. This renders the operation almost bloodless, the rectum being separated as low down as possible, and then pressed and kept in position in the lower part of the pelvis, while it is most important to shut off all raw surfaces by stitching the anterior and posterior peritoneum together.

Third.—Formation of an iliac artificial anus through a small iliac incision.

Fourthly.—Removal of the rectum *per perineo.* This is done by an ordinary Lisfranc's incision. Division of the coccyx should be avoided, as its removal often causes severe pain in the first few days in the recumbent posture. The large wound is drained, and closed slightly with a few stitches.

OBSTETRICS

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PYELITIS COMPLICATING PREGNANCY

THE occurrence of pyelitis as a complication of pregnancy is a comparatively recent discovery. Only in the more recent of obstetric text-books is any reference to it to be found, yet it would appear to be not uncommon; while, from the close resemblance which its clinical features bear to those of more serious conditions, its recognition is of obvious importance. To this similarity is no doubt due the fact that it was so long overlooked. Of this we have evidence in several of the published cases, in which the condition was at first regarded as a nephritis, a cystitis, or even as a gastro-intestinal or influenzal attack.

The first observations on the occurrence of pyelitis during pregnancy we owe to Kruse (1), but his account of the condition, buried as it was in an obscure dissertation, failed to secure the attention it deserved. It was not till Reblaub (2), three years later (1892), read a paper on the subject before the French Congress of Surgery that the complication was brought prominently under the notice of the profession. Its importance

was at once recognised, with the result that several valuable communications soon appeared. In 1893 Vinay published two cases which corroborated Reblaub's observations, while in 1899 he reviewed the whole subject and added seven further cases (3). During 1904 several important papers appeared, the first by Häberlin (4) in the *Münchener Medcinische Wochenschrift*, in which he reports eight cases; while in July Craigin (5) published an interesting and able article, at the same time detailing ten cases which had come under his own observation. Later in the year the subject was dealt with at length by Opitz (6), Kendirdjy (7), and Lebueu (8), all of whom based their observations on an analysis of numerous collected cases. The most recent contribution to the literature of this subject is to be found in the *Journal of Obstetrics and Gynæcology* for August of this year, in which Bellingham Smith (9), after a full report of three cases, discusses the etiology and clinical course of the complication.

From the number of papers which have recently appeared, and from the numerous cases reported, it will be seen that pyelitis is a not infrequent and not unimportant complication of pregnancy. While Opitz collected no fewer than 64 cases, Craigin notes that five of his cases occurred in consultation practice within a few months. Vinay believes that on an average one case occurs annually in the Maternity Hospital of Paris. In the various papers referred to nearly 100 cases are reported; and it is probable that the complication is more common than even these figures would indicate. Not only are the milder cases often overlooked, but many errors in diagnosis are no doubt still made owing to the possible occurrence of pyelitis in pregnancy not yet being fully recognised by the general practitioner. The latter fact suggests the subject as a suitable one for review.

In regard to the etiology of pyelitis during pregnancy, subsequent writers agree with Vinay that the two factors chiefly concerned in its production are: (1) compression of the ureter by the pregnant uterus; (2) infection of the urinary tract above the point of compression.

That compression of the ureter, with dilatation of its upper portion and of the pelvis of the kidney, is liable to occur during pregnancy, is sufficiently established by post-mortem examination. In a series of 196 observations dilatation was found in no fewer than 68. As a rule, only one side is affected, and that almost invariably the right. Several reasons have been advanced to explain the greater liability to compression of the right ureter: (1) the greater prominence at the pelvic brim of the right common iliac artery; (2) dextro-rotation of the uterus; (3) the frequency of the fœtal head in the right oblique diameter.

Compression of the ureter has been shown by experiment to favour infection of the urinary passage above the seat of constriction. In the primary form of pyelitis the infecting organism has been, in the great majority of cases, the bacillus coli communis.

The period of pregnancy at which the disease is generally stated to occur is from the fifth to the end of the eighth month. Opitz believes that it seldom comes on after the end of the seventh month. In the early months of pregnancy it is extremely rare.

The symptoms of pyelitis are very variable. In the milder forms they may be few or even absent, the onset being gradual, and the condition accidentally discovered by examination of the urine. Much more commonly the onset is sudden and acute. The early symptoms are pain in the right lumbar region and pyrexia. The pain may be of great severity, or it may be produced only on movement or by palpitation. It often follows the course of the ureter, and may radiate over the abdomen or down the thigh. The temperature is usually high, either at the onset or sometime during the course of the attack—102-104°, or even higher. When high, rigors not infrequently occur.

In some cases there is found, later in the disease, irritability of the bladder, with frequent and even painful micturition, the result usually of a secondary cystitis. The affected kidney can sometimes be made out enlarged and tender, but the conditions in pregnancy are so unfavourable to palpation of the kidney that the enlargement can more often not be determined. There is almost invariably, however, tenderness over the organ, sometimes marked, sometimes to be elicited only on deep pressure.

The urine is acid and contains albumen, at first, perhaps, in small quantity; but the most characteristic feature of the disease is the presence of pus, which soon makes its appearance in the urine. The quantity of pus is variable; it may be small, or so large as to give to the urine a well-marked turbidity. The pus corpuscles are uniformly distributed, indicating their origin from the upper urinary passages. They often persist for a considerable time after the constitutional symptoms have disappeared. Epithelial cells are to be found, but not in large numbers, chiefly from the pelvis of the kidney, few if any from the bladder.

The duration of an attack varies. Febrile symptoms may last only for a week or two, or they may continue intermittently during the remaining period of pregnancy. In eight of Smith's fifteen cases recovery was complete before the onset of labour. In ordinary circumstances pyelitis does not affect the course of

pregnancy, which in most cases proceeds to term; but should the temperature remain high, premature labour may occur. In three of Smith's cases labour came on prematurely as the result of the pyrexial attack.

When recovery does not take place during pregnancy it usually rapidly follows the emptying of the uterus, whether premature or at term. The first days of the puerperium may, however, be associated with slight pyrexia, while pus may persist in the urine for a considerable period. The ultimate recovery is in most cases complete. It is exceptional for an idiopathic pyelitis to end in serious kidney trouble. In two of Reblaub's cases pyelo-nephrosis resulted after labour, but in neither of the cases, as Smith points out, was the history of an earlier pyelitis satisfactory. In one he thinks it probable that there was a pre-existing hydronephrosis.

The diagnosis of pyelitis complicating pregnancy is of great importance. In most cases it presents little difficulty, if the possibility of the condition be borne in mind. When a pregnant woman is attacked with sudden pain in the right lumbar region, along with high fever and perhaps rigors, pyelitis should be thought of. Tenderness, or even enlargement of the kidney, may be made out, but the diagnosis must rest on the condition of the urine, the diagnostic character being the presence of pus in an acid urine.

There are other diseases which may present somewhat similar symptoms. According to Craigin, the three conditions most likely to be mistaken for pyelitis, all of which have actually been diagnosed, are appendicitis, typhoid fever, and salpingitis. In at least two of Craigin's cases the point of greatest tenderness corresponded closely with the M'Burney point and strongly suggested appendicitis, but the correct diagnosis was reached by an analysis of the urine. The continued fever may closely simulate that of typhoid, but is usually more irregular. In one case typhoid could only with certainty be excluded by a negative Widal reaction.

Where the inflammatory symptoms continue after labour, or pyelitis originates in the puerperium, the diagnosis from a puerperal infection may be difficult. The greater oscillation of the fever, the less severity of the constitutional symptoms, and the lack of correspondence between the pulse and temperature point to the former, which would be confirmed by examination of the urine.

The chief aid to the diagnosis of pyelitis in pregnancy is, then, as Craigin concludes, "the careful examination of the urine: chemical, microscopic, and bacteriological."

The prognosis of pyelitis is on the whole good. The disease

seldom threatens the life of the mother, and in most cases has subsided before the termination of pregnancy. Recovery is usually complete, but the possibility of the development of a protracted pyelo-nephritis, or even of a pyo-nephrosis, must be kept in mind. Two cases seem to have proved fatal from the latter complication, but it is doubtful if the condition was the result of a pyelitis originating in pregnancy. In 75 per cent. of Legueu's collected cases pregnancy went to term, while the labour was normal, and the pyelitis did not lead to infection during the puerperium. According to Legueu the danger is greater the earlier in pregnancy the disease arises, but this is not in accordance with the conclusion reached by Craigin, who thinks serious consequences more likely to supervene the nearer the complication approaches full term and the puerperium.

In the treatment of pyelitis much may be done to shorten the attack or prevent the occurrence of complications. In the first place it is important to be able to reassure the patient and her friends. The medical treatment generally adopted is as follows:—Rest in bed; fluid diet, especially milk; large draughts of water, and urinary antiseptics. To relieve the pain poultices or an ice bag may be applied over the kidney, and should this fail, an occasional opiate may be given. The urinary antiseptics usually recommended are urotropin and salol. From the beneficial effects he has obtained in the pyelitis of children the writer would suggest alkalinisation of the urine with large doses of acetate of potass, which he has found superior in children to urotropin. In view of the rôle played by the colon bacillus, the condition of the bowel should be attended to. In many cases saline catharsis has given marked relief.

In the obstetric management of these cases it will seldom if ever be necessary to induce labour, though this has been frequently recommended. Whitridge Williams (10) mentions that in two cases he induced labour, which was followed by disappearance of the pain and fever, and complete recovery. In most cases the disease has cleared up before the end of pregnancy, and, as Häberlin observes, when the febrile disturbances are acute uterine interference is contra-indicated and should, if possible, be avoided; when they have subsided, it is unnecessary.

Surgical treatment will be necessary only in the event of complications, as pyelo-nephritis or pyo-nephrosis, both of which are rare. Kendirdjy is of opinion that surgical measures should be preferred to the interruption of pregnancy before the child is viable, while after that time labour should be induced before proceeding to nephrotomy or nephrectomy. Legueu, on the other hand, while admitting that the right course is often diffi-

cult to decide on, thinks that nephrotomy is indicated up to the end of the eighth month, and that only during the ninth month should labour be induced.

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PATHOLOGY

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Etiology of Syphilis.—The discovery of the cause of syphilis has been many times confidently reported. As Lassar remarked, during the discussion which followed the reading of the paper by Schaudinn and Hoffmann at the Berlin Medical Society in May, "125 causes of syphilis have been established during the last 25 years."

We are concerned here with the latest of these discoveries, one which gives strong hope that at last the search for the cause of this ancient and ubiquitous disease has been successful.

The credit for the discovery lies with Schaudinn and Hoffmann, whose first paper appeared in the *Arbeiten aus dem kaiserliche Gesundheitsamte* (1). Later they gave fuller details in the *Deutsche med. Wochensch.* (2), and *Berliner klin. Wochenschr.* (3, 4, 4*a*, and 4*b*), and from these papers the following description is compounded.

The authors draw attention to micro-organisms of the genus Spirochæte, which they have found in primary and secondary syphilitic lesions, not only at their surface, but also in their deeper parts, and in the corresponding lymphatic glands. They saw them living—they remain alive for several hours in physiological salt solution—and also in smears from the tissue-juice, fixed in absolute alcohol, and stained by a modification of Giemsa's method.

Schaudinn holds that Spirochætes are related rather to

the protozoa than to bacteria, and hence must be clearly distinguished from the spirilla.

He describes two varieties, one found only in syphilitic lesions, the other saprophytic in nature, and constantly met with in stagnant secretions, such as occur about the genitals.

The former, which he names *Spirochæta pallida*, is extremely delicate, very weakly refractile, vigorously motile; stained with difficulty and seen with difficulty, very high powers of the microscope—$\frac{1}{12}$th oil immersion objective, with medium to No. 8 ocular being required. It is long, very thin and filamentous, spiral or cork-screw shaped, with pointed ends. In length it varies from 4-10μ; its breadth is difficult to gauge, being at most about 0.25μ, the turns in the spiral number 6 to 14, averaging 8 to 10. They are not only numerous, but very narrow, regular, and deep. Some writers describe a nucleus, but this fact is not yet absolutely proved. It progresses by rotating on its long axis, and when at rest it shows undulatory movements in its whole length, suggestive of the play of a vibratile membrane.

The second he names *Spirochæta refringens*. It is larger, refractile, the turns of the spiral flatter, wider, and more wavy or undulating than cork-screw shaped. It stains well with Giemsa's agent.

In addition to the difference in refractile power and general configuration the Spirochæta pallida differs from all hitherto described Spirochætes (Spirochæta Obermeieri, anserina, Ziemanni, buccalis, refringens, etc.) in its extraordinarily slight colorability with all stains which can be used for its detection. Moreover, the worker may have to spend at least an hour over a smear before a Spirochæta pallida rewards his patient search.

Method.—Hard sores were excised, cut into from below, the fluid expressed, and smears made, or groin glands were punctured with a hypodermic syringe and the small amount of fluid so obtained was treated similarly. It is known that the fluid from these indolent glands is infective (*v.* Rinecker and Bumm (6)), hence it was hoped that its examination would disclose the cause of syphilis.

In their first paper (1) Schaudinn and Hoffmann report that they found Spirochæta pallida in the surface lesions in 7 cases of uncomplicated primary and secondary syphilis, and in 4 out of 5 cases of syphilis with complications, in 3 of which it was associated with Spirochæta refringens.

In 8 cases of undoubted syphilis (2) the Spirochæta pallida was demonstrated in 6 smears from excised glands or in fluid obtained by puncture. In 4 cases complicated with gonorrhœa, papillomata, soft sore, and balanitis, in which, however, the

glands had the characters of the syphilitic swelling, these contained Spirochæta pallida alone.

Schaudinn also found the Spirochætes in blood from the spleen obtained during life on the day previous to the appearance of the roseolar rash.

No Spirochætes were found in soft chancres, buboes, or in carcinomatous, sarcomatous, or lupous tissues.

After summing up their results these authors conclude that "we are not far from finding the cause of the disease in this early form of life" (3).

Results of other Workers.—Metschnikoff and Roux had already succeeded in infecting apes with syphilis (6), and now they found the Spirochæta pallida in small numbers in the local lesions in 4 out of 6 infected monkeys (7). They found them, moreover, in 4 out of 6 cases in man in recent scrapings of secondary papules, and also in one case of congenital syphilis. In control cases (psoriasis, scabies, acne, etc.), they failed to find Spirochæta pallida. They have not succeeded in cultivating the Spirochætes, and have small hopes of doing so. They conclude that the Spirochætes probably play an etiological rôle in syphilis.

In the discussion on Schaudinn and Hoffmann's paper. Thesing suggested that the Spirochætes were developed in the stain. This was controverted by Wechselmann, Löwenthal, Schaudinn, and later by Giemsa, who suggested that what Thesing saw were crystals of methylene blue or methylene azure. This side issue is still being discussed (9). Buschke and Fischer found the organisms in the tissues of a congenital syphilitic infant post mortem (10), and *also* in the blood of the same case taken during life (11). Non-syphilitic children gave negative results.

Frosch found Spirochæta pallida in blood from veins, Reckzeh found it in 3 syphilitics and failed to find it in 2 other non-syphilitic patients examined (4*a*).

Raubitschek detected the Spirochæta in the circulating blood of secondary syphilis (39).

Kraus (12) insists on the necessity of making a great number of preparations, the Spirochæta pallida being often very irregularly and unequally distributed. He has never found Spirochæta pallida in controls.

R. Volk (37), on examining 31 syphilitic patients, found the parasite in the great majority. The results were negative in 13 out of 14 syphilitic glands examined, and in 17 control non-syphilitic lesions.

Levaditi (13, *a*, *b*) found Spirochæta pallida in fluid from the bullæ of syphilitic pemphigus, and also in another congenital

syphilitic infant, three months old, from the spleen, lungs, and, above all, the liver.

Salmon (36) and E. Hoffmann (14) confirmed these observations, and in addition the latter (14) reports that Schaudinn and he have found these Spirochætes in papular syphilides situated far away from the genitals, *e.g.*, on the breast and back.

Babes and Panea (15) report cases of congenital syphilis in which they found Spirochæta pallida. It was demonstrated in greatest numbers in the supra-renals. They believe that facts support the relationship of Spirochæta pallida to syphilis.

E. Hoffmann (16) has found Spirochætes somewhat similar to Spirochæta pallida in carcinomatous ulcers. He thinks that possibly some of these may be examples of the *bacillus fusiformis*.

C. Fraenkel (17) found the Spirochætes in 6 varied cases of syphilis, and writes enthusiastically in support of Schaudinn and Hoffmann, indeed going further than they do. He has no doubt whatever as to the actiological relationship of Spirochæta pallida to syphilis.

R. Herxheimer and H. Hübner (18) examined 18 cases, in 2 of which the diagnosis was between soft sore and syphilis. These gave negative results, and the subsequent course of the disease justified this finding. In 15 of the remaining 16 they found Spirochæta pallida, in one of these in *sections* of the tissues. This is so far unique. They failed to find them in syphilitic glands, in blood, or in the organs of congenital syphilitic children.

Rille (24), Baudi and Simonelli (25), Ploeger (26), and Jensen (38) were all successful in finding the Spirochæta pallida in primary and secondary lesions and glands.

Galli-Valerio and A. Lassueur (22) refer to the results of other investigators, and then give their own. They used Michaeli's stain, Ziehl's fuchsin, and Romanowsky.

They found the Spirochætes in specific condylomas and in mucous plaques in 5 out of 6 syphilitics. They failed to find them in a mucous plaque, a gland, and a hard chancre. In these cases the organisms may have been in very small numbers.

They expressly note that Schaudinn and Hoffmann do not claim that these organisms are specific.

Wechselmann and Löwenthal (19) found very short spirilla 3-4 μ long, and ask whether the Spirochætes described by Schaudinn are not formed by the union of several such micro-organisms.

Vaillemin (20) claims that Spirochætes are related to algæ. Spirochæta pallida, on the contrary, is correctly attached to the protozoa by Schaudinn, and Vaillemin proposes the name of *Spironema*.

M'Weeney (21) found Spirochætes in 9 primary and secondary cases of syphilis. His results were negative in a tertiary ulcer of the palate and in a non-ulcerating muco-purulent vaginitis. Jacquet and Sevin also failed to find Spirochætes in all *tertiary* lesions examined (27) (*cf.* Spitzer).

Gordon (23) failed to detect Spirochætes in the fluid obtained by lumbar puncture in cerebro-spinal syphilis and in tabes with a distinct syphilitic history.

L. Spitzer (28) found Spirochæta pallida in 6 primary sores, in 7 skin eruptions, in some cases even after long treatment. This is also the experience of others. He found them also in two cases of *tertiary* syphilis—in one case from distinctive infiltrations, and in the other from a gumma of the scalp. The latter case had had no treatment. No other observer has been successful in cases of tertiary syphilis. M'Weeney, Gordon, and others suggest that tertiary lesions are caused by a chronic intoxication, due to absorption of the metabolic products of the Spirochæte. Spitzer's results were negative in eczema, pemphigus, psoriasis, verruca plana, and erythema nodosum.

All the authors referred to so far (the references are arranged to a certain extent in the order in which their papers appeared) support Schaudinn and Hoffmann. A very few are critical, or even hostile.

R. Horand (29*a*) refers to his published works on a "hémoprotiste" pathogenic agent of syphilis (29*b*). The Spirochæte described by Schaudinn appears to be identical with one of the involution forms of this "hémoprotiste."

Paltauf (30), discussing the relationship of Spirochæta pallida to syphilis, emphasises the fact (according to Schaudinn) that it is not of bacterial but of protozoal nature, and represents an involution form of a blood parasite. Still, whilst one recognised Trypanosomes and Spirochætes as blood parasites, one did not know that they produced a form of granulation tissue such as is found in syphilis.

M. Schüller (31), in a review of Schaudinn and Hoffmann's communication as to the occurrence of Spirochæta pallida in lymph glands (2), doubts whether it has a causative relationship to syphilis at all. He believes that he has seen these bodies years ago, but described them as bacilli (references to papers given), and he cannot understand Schaudinn's reasons for placing them amongst the animal parasites. He suggests that they may be contaminating bacilli. He also criticises the technique employed.

Most of his objections have been answered by the numerous workers already referred to, the strongest argument against them being that the Spirochæta pallida has been found *only* in

syphilitic lesions, and never, except by Kiolomenoglou (*v.* postea), in many non-syphilitic conditions examined by similar methods.

The most important paper on the negative side is that of Kiolomenoglou and von Cube (32), just referred to.

In the first place, theywere able to confirm the occurrence of Spirochæta pallida in syphilitic lesions, but they considered it quite as important to confirm the absence of it in non-syphilitic lesions. In all their work they exercised the greatest care in making and staining their preparations.

They *found* the organism in—

1. A collection of syphilitic cases.
2. In the secretion from an inflamed phimosis. There may have been a masked primary lesion in this case.
3. In pus from a gonorrhœal abscess of Bartholini's gland in a patient with leucoderma colli specificum.
4. In simple Balanitis.
5. In pus from a scrofulo-dermatic abscess.
6. In the degenerative products of a suppurating cancer.
7. In tissue-juice of a Condyloma acuminatum.

Negative results were obtained in Acute Gonorrhœa, Syphilitic Blood, Acne Vulgaris, Impetigo, Phthisical Sputum, etc.

"We do not hesitate to claim these bodies found in some non-specific cases as typical examples of the Spirochæta pallida. . . . Particularly characteristic was the preparation from the Carcinoma."

"We must not omit to state, however, that in all the above cases we found the Spirochæta refringens as well. But we often found—and to this we attach great weight—in one and the same field, in addition to the typical forms of the Spirochæta pallida and refringens, numerous atypical Spirochæte forms whose characters corresponded to neither of these. Some of them were not so long as Spirochæta pallida, and had 2 to 3 flat wavy curves (*cf.* Wechselmann and Löwenthal), whilst in all other respects they were like Spirochæta pallida. Others stood midway between the two, and it was impossible to correlate them with either."

"There seems to be quite a Spirochæte fauna, especially frequent in stagnant secretions, so that we cannot resist the conclusion that Spirochæta refringens and the above-mentioned atypical forms are manifestly saprophytes. It must be remembered, however, that we have found Spirochæta pallida as well in such secretions, and the idea that it also may be saprophytic is not at all, as yet, to be put on one side."

They think that C. Fraenkel's conclusion that the Spirochæta pallida is undoubtedly the cause of syphilis has been spoken rather too soon. "We are at least not yet in the position to

determine the characteristics distinguishing Spirochætes occurring in syphilis from those occurring in other conditions."

One may say, in criticism, that granting all this, it does not necessarily exclude the possibility—judging from the many important, positive observations made—that the Spirochæta pallida may be the veritable cause of syphilis. It is a commonplace in Bacteriology that many of the most important pathogenetic organisms may occur in or on the body as Saprophytes, the conditions being unfavourable to the exercise of their pathogenetic powers.

Summary.—Metschnikoff and Roux have proved that syphilis is transmissible to the anthropoid apes. Later, Schaudinn and Hoffmann described extremely delicate Spirochæte forms in primary and secondary syphilitic lesions, and peculiar to syphilis. They were discovered in hanging drops or by making smears, and after fixation in alcohol, staining by a modification of Giemsa's method.

Metschnikoff and Roux found identical forms in the experimental lesions in monkeys. A considerable number of workers confirm completely the work of Schaudinn and Hoffmann. In addition, the Spirochæta has been found in the blood and organs of congenital syphilitic infants, and in acquired syphilis in blood obtained by puncture of the spleen on the day before the roseolar rash appeared, showing that it reaches the skin through the blood-vessels. It has later been found in the circulating blood. A body described as Spirochæta pallida has been once seen in a section of a syphilitic tissue. In acquired syphilis it is found only in primary and secondary manifestations, practically never in the tertiary stage.

Most authors agree that it is never found in non-syphilitic lesions.

The balance of evidence seems to be in favour of the etiological relationship of Spirochæta pallida to syphilis.

Staining Methods.—Most investigators have used Giemsa's stain (8), applied for long periods—1 to 14 hours—after fixation of the smears, which should be very thin, in absolute alcohol. Giemsa says that the optimum time for staining the Spirochæta pallida is one hour. Davidsohn (33) recommends Cresyl Violet R. extra. Reitmann (41) stains with ordinary Carbol-Fuchsin, after heating the film with Phosphotungstic acid. Herxheimer and Hübner (18) suggest Nilblau B.R. or Capriblau in 1/1000 aqueous solution, applied for 16-24 hours. Metschnikoff and Roux (7), and also Jacquet and Sevin (27) recommend Marino's Mixture (34).

Hoffmann (3) succeeded in demonstrating the Spirochætes by staining with Fuchsin and Anilin Water Gentian Violet.

Some, *e.g.* Oppenheim and Sachs (35), have succeeded with Carbolic acid Gentian Violet, and others with Romanowsky's stain. Dudgeon (40) uses Leishman's stain.

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MEDICAL JURISPRUDENCE

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Acute Poisoning by Opium and its Alkaloids..—In a recent lecture on this subject, published in the June number of the *Annales d'hygiène publique et de médecine légale*, Brouardel summarises our knowledge and amplifies what is already known, from his own wide experience. Criminal poisoning by opium and its alkaloids is very rare in France. In sixty years (1825-1885) only about a score of cases were noted. Suicide was more frequent, but the great bulk of the deaths was due to accident, such as the taking of the wrong medicine (or medicine in wrong doses), errors by medical men in prescribing, and by pharmacists in dispensing, and so on. (It may be noted in passing that in England and Wales during the decade 1886-1895, there were 3 cases of murder by opium or morphine, and no fewer than 588 cases of suicide, 384 being in males, and 204 in females. There were 1038 deaths due to accident or negligence.—C. C. D.)

After giving a short historical sketch of our knowledge of opium, and making reference to the attempts made at various times to grow the opium poppy in France in such amount as to make it commercially profitable, Brouardel refers to the composition of a good opium, and gives the following table of

constituents, of which the alkaloids form 21 per cent. and the other principles 79, including the water :—

Alkaloids, 21 per cent.		Various Principles and Water, 79 per cent.	
Morphine,	10 per cent.	Extractive matters,	31 per cent.
Narcotine,	6 „	Fatty,	2 „
Papaverine,	1 „	Caoutchouc,	6 „
Narceine,	1 „	Resin,	4 „
Codeine,	0.7 „	Gum,	20 „
Thebaine,	0.15 „	Meconic acid,	3 „
Laudamine, laudanosine, cotamine, lanthopine, cryptopine, protopine, pseudo-morphine, porphyroxine	3 „	Meconine,	1 „
		Water,	10 „

Of these bodies the action of the six first named alkaloids has been carefully studied, the most important of these six being morphine, narceine, and codeine. It is owing to the presence of these various alkaloids that the temporary excitement so often noticed when a large dose of opium has been taken is due.

Turning now to the actions of the various alkaloids in detail, the author describes the following, basing his remarks largely on Claude Bernard's (1) observations.

I. Narcotic Action.—The alkaloids which show this most prominently are morphine, codeine, and narceine. The two first-named produce sound sleep in animals, and when the effect has passed off, the animals appear dull and frightened, and the hind legs seem half-paralysed ; in the case of narceine the sleep is very profound, but the animals wake in a lively and natural condition. As regards narcotic power, narceine stands first, then morphine, and lastly codeine.

II. Toxic Action.—Claude Bernard had noticed that when he was narcotising animals for physiological experiment, the gummy extract of opium was much more toxic than morphine itself, and this he attributed to the presence of certain alkaloids. He found that 10 c.grms. of hydrochloride of thebaine sufficed to kill a dog weighing 7-8 kilos in five minutes, whereas 2 grms. (200 c.grms.) did not cause death in one of similar weight. He placed the alkaloids in the following order as regards toxicity: thebaine, codeine, papaverine, narceine, morphine, and narcotine, Rabutcau, however, who has made experiments upon himself. placed morphine first, and after it codeine and thebaine. Brouardel calls attention to the high place codeine holds in each

list, remarking that medical men often prescribe it very casually, regarding it as much more harmless than morphine.

III. Convulsive Action.—Several of the alkaloids have the power of producing convulsive movements which in some instances resemble those due to strychnine. In order of virulence in this respect, Claude Bernard gives thebaine, papaverine, narcotine, codeine, and morphine.

IV. Variability in Action.—In man, custom plays an important part as regards the action of opium, and tolerance is rapidly established. As regards the lower animals there are considerable differences, and Guinard (2), who has specially studied the matter, finds that the toxic dose (hypodermic) for the commoner animals is as follows:—

For the horse	. .	7	m.grs. per kilo.
„ ass	. .	9	„
„ ox	. .	15	„
„ cat	. .	40	„
„ dog	. .	65	„
„ pig	. .	200	„
„ goat	. .	400	„

The variability in toxicity is probably due to some modification which the toxic principles undergo in the body before they reach the nerve-cells. This is borne out by observations made by Roux and Borel (3), who found that while a rabbit could stand thirty c.grms. of hydrochloride of morphine injected subcutaneously, a single milligramme injected into the brain caused toxic symptoms almost at once. The animal lay in a state of stupor for twenty-four to thirty hours; then there was a phase of improvement, and after this it pined and died in four or five days. Morphine is certainly a poison of the cerebral cortex.

Pharmaceutical Preparations.—A consideration of these need not concern us here, as they resemble in the main the leading preparations used in England. The sale of opium and its preparations is more stringently supervised than it is with us.

Turning now to the question of absorption and elimination of the poison, it is found that whereas all the mucous surfaces can absorb opium preparations, the unbroken skin does not. If the skin, however, be macerated or abraded, the absorption of morphine goes on quickly. The most rapid effect is produced by intravenous introduction. As regards elimination, the most active channel is by way of the kidneys, but the rate varies

considerably. Some writers, as, for example, Hitzig, regard the stomach and bowels as the chief means whereby opium is removed from the body. There is no doubt such elimination does take place, though Binet does not consider it so important as Hitzig does. Some is eliminated by the skin, and also by the mammary secretion. Indeed, some authors have reported fatal cases of sucklings nourished on milk of mothers to whom opiates had been given [Houselot (4)]. In cases of chronic poisoning, morphine accumulates in certain organs, especially in the liver, brain, and kidneys. It has been found in these parts in the body of a morphino-maniac, who died thirteen days after his last dose.

The detection of morphine in the cadaver is often very difficult, though it appears to resist putrefactive processes fairly well. Dragendorff discovered it after several weeks in organic matter in solution. Tardieu (5) and Roussin, after mixing extract of opium with chopped-up ox-liver, and leaving for forty-five days, were able to detect morphine in the decomposing mass. Stas discovered morphine in all the parts of a cadaver exhumed after thirteen months, while Taylor discovered the meconate of morphine which he had mixed fourteen months previously with putrescible organic matter. On the other hand, it may be impossible to detect the alkaloid. Ogier says that as a rule, when decomposition has proceeded to a certain degree, the morphine is decomposed too, and cannot be found. Brouardel points out that in certain cases of poisoning by laudanum the stomach-wall has been found stained a slight yellow, owing to the saffron which occurs in Sydenham's tincture, and yet the morphine itself has not been discovered.

Causal Relations of Opium Poisoning.—

1. *Homicidal Poisoning.*—This, as pointed out already, is rare in France, only twenty-two cases having been reported in sixty years (1825-1885). This is due, in part, to the disagreeable taste of opium and its alkaloids, which it is not easy to mask. A case occurred in 1823, when a physician named Castaing poisoned a lady at an hotel at Saint Claud with acetate of morphine in warm wine. She had sickness, vomiting, and colic through the night, and next day another portion was administered, when she fell into a comatose state and died. Castaing was convicted. In another instance, reported by Chevalier (6), a woman got rid of infants entrusted to her care by giving them a decoction of poppy-heads.

2. *Suicidal Poisoning.*—This is more common than homicidal, and laudanum is usually employed. It is not so frequent in

France as in this country, owing to the greater stringency attending the sale of poisons in the former. Brouardel (quoting Lewin) says that in England there were 114 cases of suicide by opium in 1891, 149 cases in 1892, and 185 in 1894. These figures seem rather high.

3. *Accidental Poisoning.*—This is by far the most frequent, and Brouardel devotes special attention to it, especially from the point of view of prescribing and dispensing—a matter of great importance in France, where medical men and druggists are not infrequently punished for errors of this kind. The greatest number of deaths occur among children, sometimes through pure accident, sometimes through error. A few illustrative cases may be quoted. A physician ordered some suppositories for a child, each to contain 10 c.grms. of hydrochloride of *quinine.* The druggist read hydrochloride of *morphine,* and made them up accordingly, each one thus containing a grain and a half of the latter salt. The child fell into a profound sleep, and the doctor being called in recognised that it was deeply narcotised. The druggist was interrogated and recognised his error, but in spite of all means used to restore the patient the child died. The druggist was committed for trial [Vibert (7)]. In another instance, in 1895, Bronardel was called in to give evidence, along with MM. Ponchet and Langier, on the occasion of the death of an infant of 30 months. The doctor had prescribed an emetic of tartar emetic and ipecacuanha, and, as this proved too active, ordered a strange mixture which contained (among other things) bromide of potash, nitrate of potash, iodide of soda, salicylate of soda, tincture of digitalis, and *chlorhydrate d'ammoniaque,* 50 c.grms. The druggist insisted that the latter read *chlorhydrate de morphine,* but said that he only put into the mixture a tenth part of the morphine ordered, or 5 c.grms. The druggist had certainly some extenuation for his mistake, for none of the medical experts could decipher the word "ammoniaque," though it was equally true that they could not make it read "morphine." A conviction was obtained against both physician and druggist.

Accidental poisoning by opium occurs in adults as well as children, though not so frequently. In a recent case in the department of Tarn, a patient died after using two suppositories, each containing 0.1 grm. (1½ grs.) of morphine. On one occasion a person suffering from neuralgia called on a medico-legal expert, who, to relieve her, gave an injection of morphine in his consulting-room. The patient—a lady—lost consciousness, and it was only after three or four hours' hard work that she was restored to her normal state. No doubt the physician got a great fright, but Brouardel doubts if this condition were really due to morphine; he thinks it might have been one of the

peculiar accidents of which he has given numerous records in his writings on death and sudden death. In this connection a somewhat striking case may be cited. A few years ago, in a suburban district of Paris, there were two medical men, who, on the same day, each lost a patient (in one case a man, in the other a woman) by sudden death after a hypodermic of morphine of the strength of 1 c.grm. of the salt (one-sixth grain). This striking coincidence led to an investigation to see whether the druggist had made some error, but it was found that the solutions employed were of normal strength (1 c.grm. of salt per 1 c.cm.), and had been prepared in the one case by a druggist in Paris, in the other by one in the suburbs. Not only so, but the same solutions had been used for other patients with no bad results. Again, death may follow a small injection of morphine where there is some well-defined cause for the fatal termination, its association being merely a coincidence. A medical man was called to a patient of 17 years, and gave him an injection of one-sixth grain of morphine at 10 A.M. The youth soon became stuporose, and another physician was called in, who expressed doubts as to the propriety of the medicine. The lad died at 11 P.M., and on the supposition that an error had been made by the chemist, an autopsy was held. It was discovered that there was an extensive tubercular meningitis, and the pupils were widely dilated. The pathological conditions found were sufficient to explain death.

Lastly, a case may be cited illustrating accidental poisoning where the drug has been taken by the mouth. A physician ordered two cachets of hydrobromide of quinine for a patient, and the druggist in mistake made them with hydrobromide of morphine. The first cachet, containing 80 c.grms. (12 grains), was taken at 7 P.M. The patient in half an hour was very restless, delirious, and agitated, as if drunk; he fell into a profound sleep, and died at half-past four in the morning. The druggist was arrested and punished. In concluding this (which is the first instalment of his paper) Brouardel emphasises the great care which every medical man should exercise in prescribing opiates, especially in the case of children, and deplores the use of proprietary medicines containing morphine, such as chlorodyne, Godfrey's cordial, and the like.

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IN a summary published in this Journal (vol. xiv. p. 562, 1904), a résumé was given of our knowledge at that time regarding the serum test for blood. A still more recent paper on the precipitating action of serum appears in the *Gazette des Hôpitaux* for March 16 of this year, communicated by Dr Balthazard of Paris. He refers at the outset to the importance of being able to determine whether stains are due to blood or to some other pigment, and this determination can usually be made with certainty either by the hæmin-crystal test, or by the spectroscopic finding. When, however, it becomes needful to say what mammal the blood has come from, the matter becomes difficult, and until a very few years ago was practically insoluble, save through some adventitious circumstances. At that period three tests were suggested: (1) that based on the measurement of the diameter of the red cells; (2) that which rested on the character of the hæmoglobin crystals; (3) that which was based on the histo-chemical reactions of the leucocytic granules. The two latter are of very doubtful value, and the first must be rejected altogether, since the size of the red cells varies greatly with osmotic tension. This being the case, the announcement of the serum-test was hailed with great satisfaction, and it must perhaps be regarded as one of the greatest additions to medico-legal science within the past twenty years. It is a test which every man professing himself to be an expert must be able to perform; and as, on account of its newness, a description of it is not found in the classical text-books on forensic medicine, Balthazard thinks it a suitable subject on which to give some detailed information.

After referring to the earliest observations of Schistovitsch in 1901, the author refers to Bordel's work, which proved that, in the case of, say a rabbit, the blood would be precipitated only when treated with serum from the same species of animal. Nuttall, in England, followed up this line, and almost at the same time Uhlenhuth, in Germany, proposed the use of the test in medico-legal work. Since then there have been many workers, including Wasserman and Schulze, Linossier and Lamoine, Graham Smith, Sänger, and others, but all medical jurists agree in giving Uhlenhuth the credit for adapting the test to practical ends. To recapitulate briefly the principle of

the reaction: after having injected some 10 c.cm. of human blood serum into a rabbit, at an interval of three to four days, the animal is bled; the serum from this rabbit, if added to a solution of human blood (even though very dilute), will cause a fine precipitate almost at once. This becomes in time a flocculent deposit collecting at the bottom of the tube. If, instead of injecting serum, human blood itself is used, the serum of the rabbit acquires the power of dissolving human red blood cells. Bordel ascribes these phenomena to the presence of soluble ferments, which he has named *hæmolysin acid precipitin.*

In performing the test, certain precautions must be observed, and with these this paper is specially concerned.

1. *Preparation of the precipitating serum.* — In the first place it may be noted that the freer the blood for injection is from formed elements the better; a good source of serum in man is found in uræmic subjects on whom venesection may be performed for therapeutic reasons. The quantity injected, too, must not be great. The old doses of 10-15 c.cm. have been discarded for a smaller one of 2-5 c.cm., and this is of special advantage in the case of uræmic serum, whose toxicity may be high. Five injections at least are required, and an interval of three or four days should elapse between each. About four days after the last injection the rabbit is bled, and when the clot is separated the serum is collected under aseptic conditions.

As regards the point of injection, if it is performed into a vein, the animal may stand the first well, but may die suddenly on the second or third. Post-mortem, intra-pulmonary thrombi have been found, and it is possible that as the precipitate is forming it causes some intra-vascular clotting. The peritoneal route is often selected, and fatal peritonitis is not very common. Hausner has shown that good results may be got by deep intra-muscular injections. The rabbit is usually employed, but it is small, and only yields a very little serum. The dog is better, as 300 c.cm. of blood can be removed at a time, the animal recovers well, and can be used for subsequent experiments. The serum retains its precipitating power for about a month; it would be necessary, says Balthazard, to keep a supply of dogs ready at any medico-legal institute, since it needs fifteen days to get the precipitating serum *ab initio.* One of the dogs would furnish the anti-human serum, another the anti-rabbit, and so on. For injecting the animals primarily the serum used need not be fresh; even asepsis is hardly required, for Strangeways obtained results by injecting putrifying serum after filtration through a porcelain bougie.

2. *The Precipitating Serum.*—Having prepared the serum,

fill ten tubes, each with 5 c.cm. of the fluid, and add to the first 0.25 c.cm. of human blood-serum of the dilution of 1 to 100; to the second add diluted ox-serum, and so on. In the first tube only will a precipitate appear, forming little flocculent masses in a few minutes. It is most important that the serum tested be well diluted; if this is not attended to the specificity of the test is lost. Again, in the mixture, the volume of anti-serum must always exceed that of the serum to be tested. If the mixture be made with the ingredients in equal volumes a very faint precipitate occurs, while if the serum exceed the anti-serum no turbidity at all is perceived. Camus has shown that the precipitate is soluble in excess of the serum, never of the anti-serum. The precipitate appears in from five to twenty minutes, and may not show its maximum till twenty-four hours have elapsed. Its formation is retarded by cold, and accelerated by the tubes being kept at 37° C., but, as Strangeways has pointed out, the amount of precipitate at the end of twenty-four hours is always the same. In doing precise work one must measure the amount of precipitate quantitatively, for it is only by this means that one can determine exactly the strength of a serum. For this purpose Nuttall has proposed the use of tubes narrowed at the lower end, and graduated so that the volume of the precipitate can be read off. Balthazard prefers to centrifugalise the fluid at the end of twenty-four hours, decant off the supernatant liquid, wash the deposit again and centrifugalise once more, then dry the deposit and weigh it.

3. *Medico-Legal Examination of a Blood-Stain.*—A solution of the blood in normal saline is first obtained, and is usually of a pink tint; if very old and hard the spot can be treated for twenty-four hours with 6 per cent. soda solution, as advised by Ziemke, and neutralised with acetic acid. The solution thus made should be as near the concentration of normal blood as may be; it is then diluted a hundred-fold, and 0.25 c.cm. are added to 5 c.cm. of the anti-serum in a tube. In an hour the precipitate generally shows itself, but it is wise to wait twenty-four hours. The reaction is not characteristic of blood; it is obtained with pleuritic fluid, nasal mucus, and other bodies. It enables us, however, to say whether or not the substance is of *human* origin, but the hæmoglobin must be determined by other means. The reaction is really due to the albumins, or rather the globulins, of blood. It is given by menstrual blood, but not by the milk of woman. A control tube should always be set up. Carried out with care, this method of Uhlenhuth offers the medical jurist every guarantee of success in the determination of the human origin of a spot of blood.

New Books and New Editions

Exercises in Practical Physiology. Part II. By AUGUSTUS D. WALLER and W. LEGGE SYMES. London, New York, and Bombay: Longmans, Green & Co. 1905.

THIS little book gives practical directions for various experimental observations on the physiology of the blood, circulation, digestion, and respiration. Experiments on the chemistry of bile, milk, muscle, and urine are also described.

A distinction is made between those experiments which can be carried out by students and those which are more suited for demonstration.

The directions are clearly given, and although in a few instances some teachers may prefer methods other than those given, the experiments chosen are thoroughly representative, and the work is sufficiently comprehensive for students' use.

The Rôle of Modern Dietetics in the Causation of Disease. By J. SIM WALLACE, M.D., D.Sc., L.D.S. 87 pp. Baillière, Tindall & Cox. 1905. Price 2s.

THE title which Dr Wallace has selected for his book is a much more comprehensive one than the contents warrant. He does not deal with the whole subject, but only with a limited part of it, for he only considers modern dietetics in so far as they may be the cause of decay of teeth, and to diseased conditions which may be ascribed to faulty mastication. His opinions are strongly in favour of the necessity of food which, by containing tough material, requires careful mastication, and thus gives the teeth work to do, keeps them in good order. Some of his views as to what diseases are caused by faulty mastication are not such as many physicians would be able to adopt.

How to Keep "Fit," or the Sailor's Guide to Health in all Parts of the World. Compiled by Fleet-Surgeon W. G. K BARNES, M.D., Royal Navy. Pp. 37. London: Gale & Polden, Ltd. Price 3d.

THIS little booklet—of a size to go easily into a watch-pocket (if the "handy man" is equipped with such a thing)—contains a number of very useful hints on personal hygiene (clothing, food, etc.), and elementary "first-aid" work, concisely expressed, often in appropriately nautical language. The expression, how-

ever (on p. 28), "lie him down on his back," takes undue liberty with the King's English. A letter from Lord Charles Beresford highly commending the booklet appears by way of preface.

Laryngeal Phthisis, or Tubercular Laryngitis. By RICHARD LAKE, F.R.C.S. Eng. Second edition, enlarged and re-written by HAROLD BARWELL, M.B. Lond., F.R.C.S. Eng. Pp. 120. London: Baillière, Tindall & Cox. 1905.

THIS new edition, by Mr Harold Barwell, is a valuable contribution to the literature on the subject, and is in every way thoroughly up to date. While the general plan of the previous edition has been maintained, there has been a careful revision of the whole, and much new material has been incorporated. Exceedingly practical in its teaching, it should prove of great use to workers in the field of Laryngology.

Under the section devoted to Etiology, the authors point out that if the whole age periods of the sexes be taken, there is practically little difference as regards liability to infection; that while over the age of thirty-five the mortality among the males is markedly excessive, between the ages of five and thirty-five, and especially between five and ten, the death-rate is higher in females. We are also glad to see the fact emphasised that swelling in the inter arytenoid region without ulceration is not pathognomonic of Tuberculosis.

The main interest of the book, however, is in the section relating to Treatment. The specific treatment by Koch's tuberculin and Marmorek's anti-tuberculous serum is discussed, and the question of rest to the larynx, more especially in cases of active progressive disease, is strongly urged. The local treatment of the larynx is discussed very fully, especially that connected with removal—in suitable cases—of infiltrations and ulcerations affecting the epiglottis, arytenoids, and inter arytenoid folds by means of the author's cutting forceps, by curettes, and by galvano-cautery; and the appropriate treatment for each condition as well as the contra-indications to the radical treatment clearly indicated.

A number of illustrative and encouraging cases are appended, and the selection of suitable cases for surgical interference is rightly insisted on.

There is a full list of useful formulæ, among which the author's mixture, containing 50 per cent. lactic acid, formalin 7 per cent., and carbolic acid 10 per cent., is still highly spoken of by him.

The value of the book is enhanced by many excellent

coloured plates and illustrations, and we have great pleasure in recommending it to the favourable notice of the profession.

Psychological Medicine. By MAURICE CRAIG, M.A., M.D., M.R.C.P. Lond. Pp. viii. + 449. London: J. & A. Churchill. 1905. Price 12s. 6d.

THIS is the latest addition to the numerous treatises on insanity which have appeared within recent years in this country, America, and the Continent. It is a clearly written and readable book, and though it may hardly be said to lay great claim to depth or originality of treatment, it fairly covers the ground, and the teaching is sound and orthodox. In keeping with the trend of modern psychiatry, the subjects of paranoia, stupor, catatonia, dementia præcox, the exhaustion psychoses, and obsessional insanity are dealt with more fully than usual, but in the chapter on General Paralysis the important later views of the toxæmic school are not referred to. The volume should prove a useful guide to the student and practitioner, for whom it is more particularly intended.

The Principles and Practice of Asepsis. By ARTHUR STYLES VALLACK, M.B., Ch.M. (Sydney), L.M. (Rotunda), Surgeon to the Berrima District Hospital, New South Wales. London: Baillière, Tindall & Cox, 8 Henrietta Street, Covent Garden. 1905.

THIS little book is a practical guide to the aseptic method of wound treatment, and contains upwards of ninety pages. A brief résumé of the principles on which asepsis is based is given in an introductory portion, but the main section of the book deals with the methods of procuring proper sterilisation of all the materials employed in carrying out an aseptic operation. The author also introduces another process for preparing catgut. Clearness and simplicity of expression characterise the work: it impresses one, in fact, as being intended for those who have not had the benefit of bacteriological teaching, and in this respect we think the book should be of much service to sisters and nurses attached to operating theatres who take an intelligent interest in their work. It is neatly bound and is of a handy size.

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THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

OBSTETRIC VIEWS THAT NEED REVIEWING

By WILLIAM STEPHENSON, M.D., F.R.C.S.,
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(*Continued from p.* 105, *vol. xvi.*)

III.—Concerning the First Stage of Labour.

Undue prolongation of the first stage is of frequent occurrence in ordinary labour; bad after-effects are known to follow; and yet for years no fresh thought has been given to the subject. The tendency of the present day, indeed, is to leave the first stage severely alone, in the study as well as in practice.

Two traditional maxims have fostered this indifference: the one, that labour is a physiological process and should not be interfered with; the other, that so long as the membranes are unruptured, and the os not fully dilated, there is no danger to mother or child from a prolonged first stage.

Such half-truths do harm. Child-bearing is a physiological process; wondrous is the adaptation displayed by Nature in the mechanism of labour; and yet

> "So careful of the type, she seems,
> So careless of the single life."

As obstetricians we deal with the individual, not with the race; and certainly, whatever be the reason, this albeit physiological process entails, at times, a mischievous expenditure of energy, which might easily and safely be averted by opportune aid. Danger may not be present so long as the liquor amnii is retained; but with delay, risks are brewing, and a fatigued uterus is a fruitful source of trouble in after stages.

Prolongation by itself is not dangerous; time alone is not the measure, but time and *action*. With slow and feeble pains,

a first stage may be prolonged, even to days, without harm; but with repeated *ineffectual* contractions, danger increases by the hour.

No further apology need be given for reviewing afresh so old and familiar a subject as the process and management of the first stage of labour. To be able to appreciate the favourable conditions, *where nothing should be done*, and to detect the cause of some grievous delay, and know how best to deal with it, requires a more thoughtful and fuller study than is to be found in text-books. In them mostly the subject is treated in a purely conventional manner.

THE ONSET OF LABOUR.

At times it is not easy to determine whether a woman is in labour or not. She may be at the full term; pains have been recurring for some hours; some unusual character in their frequency, locality, or otherwise, may raise a suspicion in the attendant's mind; but from pains alone there is no certainty that labour has set in.

With a dilating os there can be no difficulty. But cases are met with where the os has not begun to dilate, and yet the first stage has advanced considerably. In others, again, the cervix may admit one or even two fingers without the patient being in labour. Clearly, other things must be taken into account.

Mechanical v. *Physiological Changes*.—In the manifold changes that occur in childbirth, it is important to distinguish the mechanical effects of uterine contractions, from others that are purely physiological; that is, where no activity of the uterus, as a whole, is required for their production. Such preparatory changes I have before referred to under the term dehiscence;[1] they may be present for hours and days before the woman is in labour. The cervical canal even may be effaced, and the portio vaginalis alone lie between the uterine and vaginal cavities. It is by observing the mechanical effects of uterine contractions on this portion of the cervix, and not merely the size of the os, that we can appraise properly the onset and the progress of labour.

[1] *Ibid.* p. 10.

1. *Before Labour.*—If a vaginal examination be made by gentle touch, without pressure likely to displace the softened tissue, the portio can be recognised as a convex, *slightly projecting* surface; soft, but readily definable from the lax vaginal walls around. If the os admit a finger, the degree of effacement of the canal can be ascertained; any sense of a canal rather than a cavity throws doubt on the pains; if the internal os be not opened up, it can be readily recognised. From these conditions false pains can be distinguished from true labour action.

2. *When Labour Action has begun,* the cervix no longer projects, but is flattened and stretched, forming a disc-like *diaphragm* between the cavities of the uterus and vagina; the vaginal walls are less lax, and are beginning to be expanded. These changes, with regularly recurring pains, give reliable evidence that labour is in process, whatever the size of the os may be. The flattening of the cervix, however, may be present for a short time before painful contractions are felt; labour is then imminent, if not actually commenced.

THE CERVICAL DIAPHRAGM.

The structure referred to above as forming a diaphragm, is the *portio vaginalis* alone. It is not part of the uterine musculature,[1] but is a closely felted structure rich in connective tissue. It possesses no muscular function, and yields only to mechanical pressure: "spasmodic rigidity of the os" is a myth.

The outer boundary of this diaphragm corresponds with the circular attachment of the vagina. Here the outer layer of the uterine muscle passes into the vaginal wall, so bringing the vagina and diaphragm directly under the influence of uterine contractions. In the centre of the flattened tissue is a ring-shaped opening—the os uteri, with margins varying in thickness and consistence.

There are thus *two rings* to be taken note of: an inner, the os uteri; an outer, the vaginal attachment. Between them lies the tissue of the portio, undergoing expansion and thinning, in proportion to the distance between the rings.

[1] *Ibid.* p. 7.

Under favourable conditions, both rings are dilated *pari passu*, a simultaneous and duly proportioned dilatation taking place, till the uterine cavity and vagina become one uninterrupted canal.

This favourable progression, however, is not infrequently disturbed. Thus the outer ring may be widely dilated, as indicated by the expansion and drawing up of the vaginal walls, whilst the os is still small or even not begun to dilate. Here the development of the diaphragm is complete.

Under other circumstances the os may be soft and dilatable, yet progress is slow; the vaginal walls are imperfectly drawn up, and the diaphragm is narrow. To imperfect dilatation of the outer ring is the delay here due. The influence of the outer ring in thus retarding the first stage has been too much overlooked. Both rings must undergo dilatation, and each has its special mechanism.

THE MECHANISM OF THE FIRST STAGE.

To elucidate the mechanism of the first stage it is necessary to resolve the energy arising from uterine contractions into different forces or modes of action, and to connect therewith the several changes which constitute the process. Three distinct effects can be observed, generally taking place in the following order, forming a regular *sequence of changes.*

1. Expansion and thinning of the tissues.
2. Dilatation of the outer ring, and drawing up of the vaginal walls.
3. Dilatation of the inner ring, the os uteri, with effacement of the diaphragm.

In like manner the uterine energy can be resolved into the following different forces or modes of action. Whilst all cooperate, each has its own special function :—

1. *The General Internal Uterine Pressure*, distributed equally through fluid, or shortly, the fluid pressure. With each contraction of the muscular sac, the internal pressure is increased; the relaxed lower segment is put on the stretch, and is observed to bulge. The special result is a general expansion and thinning of the tissues; the influence on dilatation is slight and indirect.

This bulging is the first indication of an effort on the part of the uterus towards expulsion. The onward movement, however, can be but slight, for the fœtal membranes and cervical diaphragm limit the freedom of movement.

2. *The Peripheral Force.*—With each uterine contraction the external muscular layer, which is continued into the vagina, must exert an upward and outward traction on the outer ring. This force, the pull of the uterus, corresponds in direction with the uterine wall, and hence may be termed the peripheral force.

By the simultaneous action of these two contrary forces, the push and the pull, the outer ring and vagina are expanded and drawn up. They influence the dilatation of the os only indirectly by thinning out the diaphragm. For direct dilatation a special mechanism is necessary, viz.,

3. *The Wedge Action.*—For effective dilatation it is necessary that some portion of the contents should project through and engage the inner ring, thus acting as a wedge. This is the dilating force proper; its absence is a common cause of delay.

The bag of waters is the natural and generally efficient means. It has the advantage of coming early into action, for it can project into a comparatively small os. A slight degree of dilatation, however, is necessary. In primiparæ, at times, even this much is absent, the os is a small resisting fibrous ring. The tissue of the diaphragm then becomes very thin, and may tear rather than dilate.

The head can act well as a dilator, but not at an early period. The os requires to be more dilated before the firm spherical body can project sufficiently to engage the inner ring. The outer ring, too, must be well dilated; if not, it holds back the head from the os. When, however, the outer ring is well expanded, and the os is *halfway dilated*, there is an advantage in rupture of the membranes, rather than waiting for fuller dilatation. The head is then a more efficient dilator than the bag of waters, for by rupture of the membranes, the uterine expulsive action is rendered more efficient.

By the simultaneous action of the above three forces—the general internal pressure, bulging and thinning the tissue of the diaphragm;—the peripheral force, drawing upwards the outer

ring;—and the bag of waters or the head, as a wedge, dilating the os,—the first stage is completed.

4. *The Axial Force.*—The resultant of these various forces corresponds with the line of the axis of the uterus; and hence, when speaking of the expulsive action, the term axial force may be used.

So long as the membranes are intact, there is usually little or no onward movement. With each pain a redistribution of the uterine contents takes place, altering the form of the organ; but one portion cannot escape independently of another, the force is acting on the ovum as a whole. When, however, the membranes rupture, the conditions are changed; there is increased freedom of movement, the liquor amnii may escape by itself, or the fœtus may advance whilst the waters are in great part retained. It is this increased freedom of movement that gives greater efficiency to the axial force.

THE INFLUENCE OF QUANTITY OF LIQUOR AMNII.

The hydrostatic action of the liquor amnii here needs only mention. Where discussion is required is concerning the effect on the progress of labour of the varying amount of waters met with in different cases. When should the liquor amnii be deemed in excess? What quantity may retard progress?

The determining factor, I believe, is not the degree of distension of the uterus, nor the actual quantity as measured, but the proportion of liquor amnii to the bulk of the child. There must be a ratio that gives the greatest advantage; above that ratio, efficiency will diminish as the quantity increases.

When the amount of fluid is relatively small, more or less of the fœtal surface will be in contact with the uterus; the larger the quantity, the smaller will be the area in contact, till sufficient fluid may be present completely to surround the fœtus, without unduly distending the uterus.

In the last case, any increase in pressure will at once be distributed equally over the whole fœtal surface; the fœtal ovoid will consequently undergo no change in form, and no onward movement will be imparted to it: hydrostatic pressure is acting alone.

Under other conditions, if a considerable portion of the fœtal and uterine surfaces are in contact, muscular pressure will be exerted directly on the body and partially only through the fluid. In such a case the fœtal ovoid may undergo a change of attitude.

The belief that this "*direct pressure*" exercises an influence on the progress of labour has long been accepted ; but generally it has been assumed to take effect only after rupture of the membranes. It is entirely a question of the relative amount of the waters. Clinical facts warrant the belief that direct pressure is frequently in action from the beginning, and when such is the case the efficiency of uterine action is increased.

Under the influence of old ideas, and the delusive impression derived from palpation, the obstetric mind in dealing with the first stage, still pictures a quantity of liquor amnii larger than frozen sections have as yet revealed, and various estimates have shown to be the case.[1]

Lahs, whose views have been largely adopted, erred in this respect. He argued that normally, even after rupture of the membranes, sufficient fluid was retained to separate the fœtal body from the uterine wall; and except under abnormal conditions, direct pressure did not occur.

Ohlshausen, on the other hand, by reference to frozen sections, and from estimates he made by measuring the quantity of the waters retained after rupture of the membranes, has shown that direct pressure must come frequently into play under ordinary conditions.

They err, who argue that so long as the membranes are intact, the presenting part exercises no influence on the

[1] By measuring the water displacement of casts of the uterine cavity and of the fœtus, Freeland Barbour found in one case (8th month and 2nd stage), the former 137½ cub. in., the latter 111½ cub. in., giving 26 cub. in. as the bulk of the amniotic fluid. In another case the amount of liquor amnii after rupture of the membranes was 19 cub. in. Lusk, in another case, found the whole contents 97.6 cub. in., for the fœtus 92.1 cub. in., making the amniotic fluid only 5.5 cub. in.

Olshausen measured in 200 cases the quantity of fluid that escaped when the child was born: in 80 per cent. it did not exceed 300 cubic centimetres (roughly, 18 cub. in.), and in 60 per cent. it was not over 200 cubic centimetres (12 cub. in.). He estimated that about 300 cub. centimetres are required to fill in the irregularities of the fœtal surface, and that less than this would not wholly separate the body from he uterine wall.

process of dilatation. Is not that process often unsatisfactory in abnormal presentations? Is it not a common experience, when the head is held up, as in a narrowed brim, to find dilatation long imperfect, notwithstanding good pains and a good bag of waters? In like manner the head may be restrained by means of liquor amnii.

Whatever the explanation may be, there seems to be a mechanical advantage when the head is kept well into the lower segment along with a moderate amount of fore-waters. It indicates a favourable amount of liquor amnii. On the other hand, a full bag of waters and the head difficult to reach or mobile and receding with each pain, is evidence of an amount of fluid likely to retard progress. The fœtus should always be the dominant factor, with the liquor amnii considerably less than it in bulk. The favourable ratio is that which permits of the early action of direct pressure, and at the same time supplies a moderate bag of fore-waters.

It has become customary to speak of the first stage as that of dilatation, and the second as that of expulsion. The distinction is artificial and scientifically inaccurate. From the onset of labour, every pain is expulsive in character; till the head is born the process throughout is one of dilatation. The imaginary separation of the two actions has led to the opinion that, so long as the membranes are intact, the intra-uterine pressure acts as a dilator only, and "plays no part in causing the descent of the child." That is true under certain conditions only. Do we not at times find the head advancing in the pelvis, though the membranes are intact, and the os but partially dilated? The question is again simply one of relative amount of liquor amnii. To cause delay, it may not be large in actual measured quantity, yet be in excess, as regards facility in the mechanism; and such excess, I believe, begins when the fœtus is wholly surrounded by the waters.

THE MODE OF EXTRUDING THE FŒTUS.

Clinical observations and the study of frozen sections have proved that, from the beginning of labour till the birth of the head, the fundus uteri remains at its original height in the abdomen; at times it even rises to a higher level. The long

diameter is lengthened downwards, the transverse diameters are shortened. It is also recognised that a corresponding change takes place in the fœtal ovoid. It, too, is lengthened proportionately.

The import of these facts has not been fully apprized. When the mind grasps the truth, we realise that the propulsive movement is not, as generally supposed, the result of downward pressure on the breech by the fundus. The body is not propelled *as a whole*, breech and head moving simultaneously in the same direction. Whilst the head is moving, the breech is stationary. The dorsal curve is straightened, and thereby the head can advance, whilst the breech remains at the fundus; not until the head is making its exit from the pelvis does the propulsive movement become general. In short, the fœtal ovoid is lengthened by lateral compression.[1]

Under this view, *dorsal extension* becomes a factor, and not a mere incident, in the advance of the head. Conditions that favour it will facilitate progress; those that interfere with it are disadvantageous.

Given a vertex presentation, the membranes ruptured, and the ball-valve action of the head perfect, the os need not be fully dilated; the mode of propulsion will differ according to the relative amount of liquor amnii retained *in utero*.

In one case we can imagine all the fœtal body above the girdle of contact surrounded by the waters. The hydrostatic pressure will then be equal over the whole body of the fœtus; with each pain there will be no change in the attitude of the child; the extruding force in such a case is the fluid pressure alone, acting on the upper surface of the head.

In another case, picture the dorsum and breech in contact with the uterine wall, and the retained waters sufficient only to fill up the inequalities of fœtal front, and maintain the even outline of the uterine cavity. Here the fluid pressure is acting on the head, equally as in the first case; but in addition, direct pressure is acting on the body. Not, however, by an onward push from the fundus on the breech, but by a transverse pressure extending the vertebral column. The *convex* dorsal

[1] The difference of this view, as contrasted with the old, may be realised by comparing the emptying of an indiarubber syringe, when compressed by the hand, with the older instrument emptied with a piston.

surface of the fœtus is in contact with the uterine wall, whilst the fluid pressure is limited in area to the irregularly *concave* surface of the fœtal front. Thus limited, the same hydrostatic pressure that forces the head downwards will retain the breech in the fundus; and combined with the transverse direct pressure on the back, straightens the dorsal curve.

From this representation of combined fluid and direct pressure, we can understand why the fundus remains at the same level until the head is passing through the vulva; or in other words, that the long diameter of the uterus does not shorten until the dilatation of the entire parturient canal is accomplished. Till the successive dilatation of the os, the vagina, and the perineum is complete, the action is one of elongation of the fœtal ovoid by lateral compression.

The fœtus is the dominant factor in this change of form, for were the fluid to be near to or exceed the bulk of the fœtus, the uterus, during contraction, would tend to the spherical instead of the ellipse, the sphere being the form that, for equal bulk, gives the smallest superficies. Ordinarily the quantity of fluid is much below this proportion, so that the fœtal determines the change in the uterine ovoid.

In hydramnios we have an illustration of this tendency to the spheroidal. The first stage is always unduly prolonged. The reason is generally stated to be defective power from over-distension, but the uterus is often equally large in multiple births. To my mind it is not defective power in the muscle, but the difference in the change in form under contraction; becoming more spherical instead of lengthening the ovoid; and hence the diminished effect on the os uteri.

A true excess of liquor amnii, calculated to retard progress, may be present when the quantity is far below what would warrant the term hydramnios, or even suggest the idea of over-distension. It can be recognised, *per vaginam*, during a pain, by a flattened rather than bulging cervical diaphragm, and the membranes stretched across instead of projecting through the os. In other cases there is a large and bulging bag of waters, and the head difficult to reach or felt to recede. In this category also may be placed cases where the membranes remain tense in the interval between pains.

Nature's mode of overcoming such disadvantageous con-

ditions is rupture of the membranes: the uterine force then becomes more effective, and progress is often rapid. Artificial rupture therefore is a valuable aid, as all have experienced; but the time when it can be advantageously done is still a matter for discussion. This belongs, however, to the management of the first stage, the subject of a paper to follow.

The ideas presented in the above review are consistent with the scientific facts of labour, so far as they have yet been ascertained. They are applicable to not merely one set of chosen conditions, but to any and all of the varying states met with in different cases. In conclusion, it may be well to formulate some of the opinions now advanced.

1. A prolonged first stage is more frequently due to unfavourable mechanism, than to "rigidity of the os."

2. The size of the os is not the sole criterion of progress in the first stage. Along with this inner ring must be taken an outer ring, the vaginal attachment: the relative condition as to dilatation of both must be noted. The dilatation of the outer ring is mainly dependent upon the peripheral force, that of the inner ring upon the wedge action. The outer ring may be fully dilated before the inner has begun to open: defective dilatation of the outer ring may be the cause of delay in dilatation of the os.

3. The fœtus is the predominant factor throughout labour; the presenting part exerts an influence on the first stage.

4. A moderate amount of liquor amnii is more favourable than when considerable, relatively to the bulk of the fœtus. It is more favourable when the quantity permits of an early combination of direct pressure with the action of the amniotic fluid. An excess, liable to retard progress, begins when the fœtal body is entirely surrounded by the waters; and defective action is greater the larger the quantity.

5. Until the head is born, dilatation and propulsion are effected simultaneously by elongation of the fœtal ovoid, not by pressure on the breech. Dorsal extension is an important factor in the mechanism. Whatever hinders this action renders the process less facile: this may be an excess of fluid, but also it may be the lie of the fœtus.

6. The head is an efficient dilator, even in the first stage;

but till the outer and inner rings are sufficiently dilated to admit of the head engaging them, there is a decided advantage in retention of the fore-waters. After the os is half-way dilated, unnecessary delay may arise from integrity of the membranes.

MALTA FEVER IN PREGNANCY[1]

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CASES of Malta or Mediterranean fever in pregnancy are of sufficient rarity to warrant their being recorded even when, as as in the present instance, they are not accompanied by interruption of the gestation or any other accident.

The patient who was the subject of the above-named complication of pregnancy came under my care in July 1904. She was 25 years of age, and was within a few weeks of the full term of her first pregnancy. She and her husband, a medical man, were living in India when she was attacked by the fever. The first day of the last menstruation was October 20, 1903, and the fever began about the first day of December, when, therefore, it may be supposed she was about a month or five weeks pregnant. The following notes of the course of the case were supplied to me by her husband.

The symptoms and signs at the commencement of the fever were lassitude, constipation, slight enlargement of the spleen, and pyrexia. The temperature rose to about 103.5° each evening and dropped a degree or two in the morning. This state of things continued for about six weeks, the temperature, however, often dropping to the normal in the morning and beginning its rise again about noon or 1 P.M. During this time quinine was administered, as a therapeutic test, in large doses. At first it was given in acid mixture, about 25 to 30 grains in the twenty-four hours. As this caused nausea and vomiting, it was next given as intra-muscular injections, to the extent, during one period of 24 hours, of 40 grains, after it had been given to the extent of 30 grains daily for several

[1] Read before the Edinburgh Obstetrical Society, March 8, 1905.

days. Since this treatment had no discernible influence upon the course of the fever, the patient's blood was tested for the serum reaction ; and Major Semple (I.M.S.) reported at the end of December that it reacted to the Malta fever test. Quinine was not given again. At the recommendation of Sir Patrick Manson and others the patient undertook the voyage home to England. She left India on January 23, 1904. During the voyage, arsenic was tried, but seemed to have little effect ; the temperature, however, often rose only one and a half to two degrees above the normal. Thereafter the fever was often absent for a week or ten days, and then would begin the rise again. It lessened month by month, and during April 1904 the constipation (which had been a prominent feature) began to yield. During the first six or eight weeks it had been extremely obstinate, and large doses of powerful purgatives (*e.g.* of jalapine) had been required to produce even a mild action. In June the blood was again tested in the School of Tropical Medicine in London ; and it was reported that it no longer reacted to the Malta fever test. After the beginning of June no further fever was noticed. The joint pains of a rheumatic and neuralgic character, which are often severe in this disease, were moderate in this instance ; there was slight sciatica. Enlargement of the spleen was palpable until about the end of March.

The pregnancy was further complicated by the presence of the intestinal parasite, *Taenia mediocanellata.* This may have been one of the causes of the frequent nervous symptoms of depression and irritability which existed during the whole time, and lasted till a month after delivery.

Labour pains began on the evening of August 5, 1904, and continued during the night. At 8 A.M. on August 6, the os was found to be fully dilated, and the head was descending, L.O.A., with the membranes unruptured. The waters came away about 10 A.M., and the child was born three-quarters of an hour later. The head passed very rapidly over the perineum, which tore to some extent, requiring the introduction of two stitches. With this exception the labour was absolutely normal. The third stage was uneventful ; and the placenta, which was of the circumvallate or marginate variety, was easily expelled. In the evening the temperature was 101°, and

the pulse 80; but after a good night's sleep the temperature and pulse fell to the normal, and the patient made an uninterrupted recovery. About the beginning of September, however, she had a high temperature for a day or two, regarded by her husband as due to influenza, a friend suffering from that malady having been to see her. The baby, a female, was healthy and continued so; she was well nourished and well formed.

In this remarkable case two facts are of outstanding importance. One is the administration, with no serious consequences, of massive doses of quinine in the form of intra-muscular injections, to a pregnant woman, who was not suffering from malaria. It has been customary to regard quinine as an oxytocic medicine save in the cases where, on account of the co-existence of malaria, it may be presumed that the force of the remedy is exerted against the malarial poison, and so does not set up uterine contractions. The history of the case, the serum test, and the duration of the pyrexia, show that this was an attack of Malta fever or Undulant fever (as it is more commonly called), and not one of malaria; otherwise, of course, it might be said that, after all, we had here to do with ordinary malaria, and that therefore the quinine had no oxytocic effect. A further argument against this conclusion is given by the non-efficacy of the quinine as an antipyretic, even when given in massive doses. We must, therefore, conclude that even in cases of fever which are not malarial, and in which quinine has no antipyretic action, that drug may not interfere with the normal progress of pregnancy although given in large doses.

The second fact is no less interesting. In this instance the attack of Malta fever lasted from the first day of December 1903 to the beginning of June 1904, and for six weeks the temperature was above 103° F. every evening. Yet, notwithstanding this prolonged pyrexia, the pregnancy not only progressed satisfactorily to its normal termination, but was followed by a normal labour and puerperium, and resulted in the birth of a healthy female child, who had been nourished by a placenta which, although marginate in type, showed no gross lesions or hæmorrhages. The mother, it may be added, was able to suckle her infant. Are we then to conclude

that Malta fever is an innocuous complication of pregnancy? I do not think we can do that, and for the following reasons.

Malta fever is a pyrexial disease, endemic in certain localities, including Malta, Gibraltar, and the Mediterranean ports in general, but occurring also in India (as in the present case), in North and South Africa, in South America, and in China. It has a long and indefinite duration, and shows a marked tendency to undulatory waves of temperature, from which comes the name Undulant fever so often given to it. Its symptoms may be gathered from the following synonymous names which have been given to it: intermittent or remittent typhoid, typho-malarial fever, gastric or bilious remittent fever, and simple continued fever. It is due to a microbe, the micrococcus melitensis, discovered by D. Bruce (*Practitioner*, xxxix. 161, 1887; xl. 241, 1888) in 1886; it is probably air-borne; and a partial immunity is acquired by long residence in an infected area. It has a low mortality, about 2 per cent. In the early stages of the fever the diagnosis was made with great difficulty, but now that Widal's serum test is available it has become comparatively easy, agglutination being obtained about the fourth day of raised temperature. The chief danger is heart failure; but hyperpyrexia may also occur. Neuritis, acute or subacute, is very common, and, as in the case recorded, there may be considerable nervous depression and irritability. No drug has any specific action on the fever. It is now becoming customary to allow a more generous diet, including solid food, instead of the beef-tea and milk of former times; and a marked improvement in results has followed the innovation. Malta fever, therefore, is a disease resembling typhoid in many particulars; for this reason alone it may be expected to become a serious complication of pregnancy. There is, however, more definite evidence upon the matter from direct observation of cases in which the fever has gravely interfered with the progress of gestation.

G. Levi (*Archivio di Ostetricia e Ginecologia*, xi. 535, 1904), in an article on "Gravidanza e Febbre Mediterranea," has gathered together eleven cases observed in Tunis, in which Malta fever attacked pregnant women. Three of the eleven cases occurred in Levi's own practice, and the others were managed by Tunisian medical men, who furnished him with

the details. In five of the patients the fever came on at the third month of pregnancy, in two at the fourth month, in one at the fifth, in two at the seventh, and in one at the eighth. They all had typical attacks save one, in whom there was marked jaundice. Abortion occurred in six cases; in two at the third month, in three at the fourth month, and in one at the seventh. Five of the pregnancies went to the full term: in them there was the record of one dead-born child, two who died in one and several months respectively, and two who remained alive at time of writing. The infant that was dead-born died in the labour; it was markedly jaundiced, as the mother had been. In six of the cases the fever ceased about a week after the termination of the pregnancy, in one in twenty days thereafter, in two in a month, while in two it was still present at the end of the puerperium. In two only of Levi's cases were healthy infants born at the full term, and in both of these instances the Malta fever had attacked the mother late in pregnancy, viz. at the seventh and eighth month respectively. In the case reported by myself the fever came on at the fifth or sixth *week*, and yet the pregnancy was uninterrupted, and the child was born healthy and continued in good health.

From his clinical experience, Levi draws the following conclusions. Malta fever is somewhat rare in pregnancy. The interruption of the gestation happens somewhat frequently, especially when the infection occurs in the early months. The most common cause of the interruption is the high temperature. The infection may pass from the mother to the fœtus, but more usually the latter is poisoned by the toxines which are generated. The medicines which are commonly employed in the treatment of Malta fever do not modify the course of the pregnancy. Abortions, labours, and puerperia are not modified by the infection with Malta fever, and the effect of the pregnancy upon the fever would seem to be practically *nil*. Labour and the puerperium, when they occur in the later and less virulent stages of the fever, would seem to have a favourable effect. The treatment ought to be the same as that used in Malta fever in other circumstances.

With most of Levi's conclusions it is possible to agree, but the case just recorded proves that even a long continued and high

temperature in the early months need not be accompanied by abortion, and may even be followed by the birth of a full-time, living, and absolutely healthy child. Malta fever may be a rare complication of pregnancy; but it does not seem, taking Levi's statistics themselves as a basis, that there is evidence that pregnancy confers even partial immunity from Malta fever.

ON PERCUSSION OF THE APICES OF THE LUNGS

A Clinical Lecture

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LADIES AND GENTLEMEN, I wish to devote a part of our hour to-day to consideration of a subject whose scope is limited, it is true, but whose importance can hardly be exaggerated. I refer to percussion of the apices of the lungs. As too often practised, this method of physical diagnosis is apt to fall far short of completeness. Hence cases of incipient tuberculosis, with symptoms of grave meaning, such as cough, slight loss of weight, slight feverishness, are allowed to glide along in the ordinary routine of their lives, because no definite physical signs have been made out. As a matter of fact, one may have little to guide one. The signs on auscultation may deviate little from normal, but if there is any diminution in the resonant area, the explanation of the symptoms may be apparent, and immediate steps will probably be taken on modern lines to check the disease.

To diagnose the earliest cases of tuberculosis you must familiarise yourselves with *all* the methods of investigation we have at our disposal.

Now remember that although the lungs extend for a little distance (3 to 5 cm.) above the clavicle, their mass up here is by no means great, hence the necessity of using the utmost gentleness in percussion. This is a good rule for percussion generally: if you endeavour to accustom your ear to the finer shades of sound, you will have far more satisfactory

results than if you try to bring out notes that might be heard over a large class-room. Even in the case of organs overlapped by a lung, such as the right auricle in the fourth right space, I can fully confirm the value of gentle percussion so admirably insisted on by Dr Lees in his recently published work on "Acute Visceral Inflammations."

Forcible percussion of the apex of the lung might bring out confusing vibrations from more distant parts of that organ, from the trachea, or from the vertebræ. But remember that gentle percussion does not mean feeble, flaccid strokes, such as one often sees with beginners. A good method is to use the ungual phalanx of your left hand, firmly pressed on the skin, as plexímeter, the other digits being held off from the body. The best hammer is the middle finger of the right hand; it should be well curved, and the strokes delivered perpendicularly with a movement from the metacarpo phalangeal joint, or, if you prefer it, from the wrist. This is my own favourite way, but others may be as good. Whatever method you adopt, stick to that, if it is a good one.

Now as to the position of the patient. Circumstances may make it necessary for you to do your best with the patient lying, but, if possible, he should be sitting either on a chair, as in the case I bring before you now, or in bed, stripped to below the armpits, his head slightly bent forwards and his arms hanging loosely by his sides. The head should be kept straight to prevent sterno-mastoid tension, and special attention should be given to relaxation of the trapezii. You see here how the trapezius extends from the neck to the shoulder, forming a high ridge; its anterior edge comes down in front for some little distance. Owing to the thickness of this muscle, it is often difficult to get as satisfactory a note behind as in front. The examiner should first devote his attention to mapping out each apex, and should stand on the corresponding side of the patient. Now, in most text-books you will find directions about percussing the upper borders of the lungs anteriorly and posteriorly, but they are not so complete as they should be, and sometimes are actually misleading. Thus, in Vierordt's book you will find a diagram representing the upper margin of the lung posteriorly by a line which is nearly horizontal, reaching to the vertebra prominens. I shall soon

show you wherein this is wrong. I think the best method that can be adopted is that devised by Prof. Krönig, of the Friedrichshain Hospital in Berlin, and published in 1889 (*Berliner klinische Wochenschrift*, No. 39). Another paper by him appeared in the *Medicinische Woche*, 1901, No. 15.

The idea underlying his method is simply this—that we should try to map out the boundaries of this part of the lungs on all sides, being guided not so much by an anatomical conception as by the actual area of resonance. When this is done

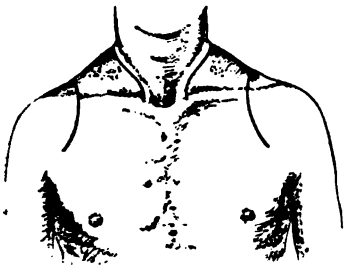

FIG. 1.—Anterior resonant area over lung-apices (after Krönig).

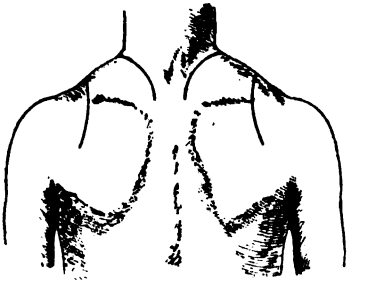

FIG. 2.—Posterior resonant area over lung-apices (after Krönig).

we find we can mark out two lines, passing from the clavicle right over the top of the shoulder and for a short distance down the back.

Better than any description is the practical demonstration I give you, which you may compare with Figs. 1 and 2 (after Krönig). The spaces between those curved lines, Krönig calls *resonant areas* (Schallfelder).

By laying the pleximeter finger parallel to the expected boundary-line and percussing relatively gently as I have said, you can quickly, with a blue pencil, mark off the inner and outer lines. In normal lungs these are fairly sharply defined, though one skilled observer might differ from another to a trifle of half a cm. or so as to where the line ought to be drawn. The narrowest part of the field is at the top; for this the term "isthmus of the apex" has been suggested (Wolff). It should measure 4 to 5 cm. in a healthy adult, and a note of its breadth may be usefully made on the case-sheet. The inner line passes downwards and forwards from this with a curve to the sterno-mastoid muscle and sterno-clavicular joint, downwards and

backwards, with a slight median convexity to within a finger's-breadth of the middle line, about the second or third dorsal spine. The outer boundary-line passes downwards and outwards anteriorly over the concavity of the clavicle to the front of the shoulder-joint, while posteriorly it crosses the spine of the scapula, curving outwards as it descends. The direction of the lines and the distance between them at any level ought to correspond closely on the two sides of the body. In children and poorly developed adults such as we so often have in our Infirmary, the isthmus often measures only 2 or 3 cm., without there being any suspicion of disease. The next step is to compare the two apices as to the *degree of resonance* elicited, and also as to the *sensation of resistance.*

Now we come to deviations from the normal. First, I may mention a condition which must be very rare, but which Krönig has met with several times, a displacement of the apex outwards, without diminution of the resonant field—hetrerotopia. This must be congenital, and is only a possible cause of mistake if attention be directed to the inner boundary-line alone. Cicatricial contraction after glandular abscesses, for instance, may likewise cause displacement of a normal apex. In emphysema you will get some enlargement of the fields, but by far the commonest alteration is the opposite of this. In the various conditions connected with tuberculosis—pleural thickening, infiltration with tubercles, lobular inflammations, caseation, fibrous contractions—there is almost certain to be found a narrowing of the isthmus. This may involve the inner or outer boundary-line, or both (Fig. 3).

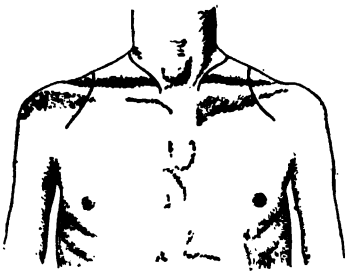

FIG. 3.—Contraction of left lung apex, causing approximation of both boundary-lines (Krönig).

Sometimes in simple infiltration the size of the resonant field may be undiminished, but the amount of resonance will probably be impaired. In these cases there is a want of sharp definition about the boundary-lines. When the note obtained is somewhat alike over both apices, it should be compared with the condition below the clavicles, due regard being paid to the

fact that the note here is normally clearer than it is above. Not infrequently you may meet with cases in which a narrowed isthmus is not associated with any symptoms. This is not surprising when you remember how common apical cicatrices are in the post-mortem room, although the cause of death may have had nothing to do with the lungs. But whenever there is any reason for examining the lungs, you will find that a systematic examination of the apices will help you to avoid many a pitfall.

NOTE.—Other papers on Krönig's method, besides his own, are the following:—
Oestreich. *Zeitschrift für klin. Med.*, 1898, Bd. xxxv.
Wolff. *Deutsche med. Woch.*, 1903, No. 6.
Alexander. *Deutsche med. Woch.*, 1903, No. 31.

PRACTICAL REMARKS ON THE "NARCOSIS" PHASE OF CHLOROFORM ANÆSTHESIA, WITH ILLUSTRATIVE CASES

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THE clinical state frequently occurring during the administration of chloroform, and generally known as "narcosis" or "chloroform sleep," is a subject of great importance to every administrator of chloroform. It is nevertheless one that is little more than merely touched on in works dealing with the subject of anæsthetics. The bare advice may be given that the anæsthetist must be careful to ascertain that the patient is not simply "sleeping"; any rules or signs whereby the narcotic condition may be recognised and treated are usually conspicuous by their absence.

Until the anæsthetist—the term is used in the general, not merely in the special sense—has, through experience, become familiar with the condition, and has learned to allow for and eliminate it, narcosis will be accountable for many of the failures and difficulties and disappointments of chloroform administration. Putting inexpertness and carelessness aside, it is almost invariably the cause, especially in the case of children, of the patient not being properly "under" at the moment of incision, also of his unexpectedly "coming out"

during the course of the operation. Further, it is extremely probable that many of the so-called "chloroform frights" are in reality the same condition presenting itself in another aspect, one that may closely resemble the appearances caused by an overdose of chloroform.

In the writer's opinion, the regulation teaching as to the appearances and course of chloroform anæsthesia is of far too hard and fast a nature. Perhaps in no other drug of the pharmacopœia is the physiological action so largely influenced by the personal factor of the patient, and upon the recognition and management of this personal factor successful administration largely depends. The anæsthetist who absolutely depends on the stages and signs of chloroform anæsthesia as commonly taught will of a certainty find himself over and over again grievously mistaken.

The small fixed pupil, absence of corneal reflexes, and other signs held as indicative of the stage of surgical anæsthesia, are quite as commonly indicative of narcosis or insufficient anæsthesia, the patient moving freely the moment the incision is made.

Again, the bugbear of dilated pupils, probably associated with shallow respiration and a certain degree of cyanosis, and generally regarded as indicating "no more chloroform," are, as a rule, the exact cause of the patient disagreeably surprising the anæsthetist by suddenly and unexpectedly "coming out" during the course of the operation.

If the cyanosis should deepen to an extreme degree, as occasionally happens, the clinical appearance may be disturbingly like that due to overdose, and much alarm is unnecessarily caused to operator and anæsthetist alike. Every anæsthetist can recall anxious and trying experiences before he learnt to discriminate between the false and the true.

Definition.—Narcosis being a purely clinical condition, a definition is almost impossible; any attempt at such would amount simply to a recapitulation of the signs detailed below.

Causation.—With regard to predisposing causes, neither the physical constitution of the patient nor the existence of any morbid condition in any of the systems appears to have any influence. On the other hand, the writer has often noted

that the very common practice of telling the patient to "take long breaths," or to "blow away the chloroform," has a very distinct tendency to cause the narcotic state.

It is much better to allow the patient to breathe easily and naturally.

The essential cause appears to be unknown, but must be due to some effect of the chloroform on the nervous system.

Probably the central nervous system is not affected, for all that is required to dispel the condition is a fuller respiration. It is further unlikely that the respiratory centre would be affected without the adjacent cardio-vascular centres also being influenced by the drug. The quality of the pulse, which is a marked feature of the condition, indicates that the cardio-vascular centres are in no way depressed in action.

It would seem probable, therefore, that the state of narcosis is due to the action of the chloroform upon the pulmonary nerve endings, whereby the impulses to respiration are for the time being diminished or even abolished. This pulmonary anæsthesia, if it may be so termed, is, however, in the majority of cases only slight, and does not prevent the physiological increase of inspiration under a painful stimulation. In this fact, as will be pointed out later, lies a distinct danger.

Occurrence.—Narcosis may occur in both sexes and at all ages of life, though infants and old people are not, as a rule, affected. It is extremely common in children, forming indeed one of the chief difficulties in the anæsthetising of children with chloroform. It is frequent in females, particularly in girls between the ages of fifteen and twenty-five.

In males it is uncommon; when it does occur it is in patients of a distinct neurotic type.

In females the neurotic temperament is by no means an invariable factor. Women and girls of a perfectly sound nervous organisation, when placed under chloroform, often exhibit a well-marked narcotic state.

Narcosis most commonly comes on during the induction period of anæsthesia, less commonly during the course of the operation, and in rare cases after the operation is finished and the administration of chloroform stopped.

During the induction there may be a stage of some excitement, after which the patient sinks, often very rapidly, into

a condition closely resembling the stage of surgical anæsthesia; or the condition may come on quietly and gradually.

The former type is the more deceptive; the contrast between the period of excitement and the narcotic state is so marked, and the simulation of surgical anæsthesia so close, that the anæsthetist is utterly chagrined when the incision proves the falsity of the appearances.

Narcosis may come on during the operation after the first and presumably painful stage is past.

In most surgical procedures there is a reflex stimulation of the respiratory centre if the anæsthesia be not sufficiently deep. It is well known that in certain operations, for example certain abdominal operations where the parietal peritoneum is not manipulated, painful impressions are practically absent. It is in such cases where the reflex influence upon the respiratory centre is in abeyance that the narcotic state is likely to supervene. This influence is perhaps not completely absent, since in this particular aspect of the condition the pupils are commonly somewhat dilated.

This type of narcosis simulates not surgical anæsthesia, but the effects of a slight overdose of chloroform. The administration accordingly is stopped and perhaps even some restorative measures taken, with the disagreeable result that very speedily the patient is vomiting and straining.

Aggravated examples of this type of narcosis where the signs are extremely well marked are usually regarded as due to overdose, but as will be shown, there is a definite distinction between the two conditions.

Post-anæsthetic narcosis is very uncommon, but the writer has certainly met with one typical case.

Signs.—The signs may vary to some extent, and may not be all present in any one case. Typically there are seven distinct signs of the condition.

1. *Respiratory Depression.*—In minor forms of narcosis the respiration may be simply of a Cheyne-Stokes character.

Typically it is infrequent, extremely shallow, diaphragmatic in nature, and, in aggravated cases, may be nil for several seconds at a time. It thus differs distinctly from the regular, fairly full respiration of true surgical anæsthesia.

This respiratory depression is apparently the chief factor

in the narcotic state. In ordinary cases a moderate sensory impression effects a fuller respiration, and the whole clinical condition rapidly passes away.

In the severer cases, however, the respiratory centre appears not to be influenced even by a profound impression such as a laparotomy incision. In such cases the narcosis persists, and probably deepens with the progress of the operation.

2. *State of Pupils.*—The pupils may be contracted or dilated to a varying degree. If narcosis comes on during the induction stage the pupils are, as a rule, contracted, often to mere pin-points, but in a proportion of cases they are more or less dilated. When narcosis comes on during the course of operation, the pupils are almost always dilated, often fully so.

What the reason for this variability in size may be is impossible to say.

3. *Absence of Pupillary and Corneal Reflexes.*—This is an invariable sign of narcosis, whether the pupils be contracted or dilated. The writer has observed that in some cases the consensual reflex may be obtained, but to the usual tests of light and touch the response is invariably nil. This of itself serves to indicate that narcosis is something more than a mere light or insufficient anæsthesia. It is a strange and interesting point that so sensitive a part as the cornea should exhibit so complete an absence of sensation, when an ordinary sensory impression such as facial friction will at once show that the nervous system is by no means inert. This absence of reflexes is certainly not due to any local effect of chloroform on the cornea itself; it is frequently to be observed in cases where the anæsthetic is administered through a mouth tube.

4. *Muscular Relaxation.*—Well-marked flaccidity is invariably present, even to the dropping of the under jaw, declared by some writers to be a certain sign of surgical anæsthesia.

The tongue, however, does not fall back into the pharynx and may thus serve as a point of distinction.

5. *Cyanosis.*—In a typical case of narcosis, cyanosis is an important and prominent feature. It may be absent in the slighter forms, but is always present in the more marked cases. It varies in degree from a bluish tinge of the lips to the typical dark blue appearance of asphyxia in those aggravated cases where the respiration is nil for appreciable intervals,

and the aeration of the blood consequently reduced to a minimum. It is not due to any obstruction to respiration, but simply to the extreme shallowness and infrequency of the respiratory act, though probably if it continue for any length of time the venous blood has a depressant effect on the cardiac muscle and thus a vicious circle may be established. The degree of cyanosis depends entirely upon the quality of the respiration : the more marked the shallowness and infrequency, the deeper the cyanosis. Establishment of a freer respiration rapidly dispels the condition, thus proving that cardiac insufficiency is not an essential factor in its causation.

6. *Satisfactory State of Pulse.*—The pulse is invariably of good quality in true narcosis. The frequency may vary, but the strength and volume are satisfactory.

In severe cases, where narcosis persists and the cyanosis steadily deepens, the pulse may ultimately show signs of failure. Even in such a case, recovery of tone is speedily established once the anæsthetic is stopped.

7. *Peculiar Staring Aspect of Face.*—This is not an invariable sign, but when it does occur is characteristic. It is most common in children. The chief feature is a widely-open eye, showing a large amount of conjunctiva, and an indescribable, staring, "far-away" gaze, which when once recognised cannot be mistaken.

8. *Excessive Salivary Secretion.*—A hyper-secretion of clear watery saliva is a common feature. The fluid usually runs freely out of the mouth when the head is kept on its side—the correct position—but in many cases it accumulates in the hollow of the cheek, giving no sign of its presence.

Diagnosis.—Narcosis simulates surgical anæsthesia on the one hand, and the effects of overdose of chloroform on the other. The former aspect of the narcotic state commonly comes on during the induction period of anæsthesia. The shallow, infrequent respiration is quite different in type to the respiration of true surgical anæsthesia. The rapidity with which the patient appears to go "under," and the small quantity of chloroform required, even in adults, are distinguishing features. Above all, any moderate sensory impression, such as briskly rubbing the face, will at once in the majority of cases indicate the true state of the patient. If in this type the pupils be not contracted,

but dilated, as well as immobile and insensitive, and a certain degree of cyanosis present, as happens in a proportion of cases, the character of the pulse clearly points out that these signs are not caused by a slight overdose of the anæsthetic.

The type of narcosis which appears during the course of operation, and in which all the signs may be well marked, can also be distinguished from threatening overdose by the pulse. The simulation in some cases may be extremely close, but the pulse condition will be found a satisfactory guide if the anæsthetist will only have the courage of his convictions. Facial stimulation and other ordinary impressions in these aggravated cases fail as a test. It need only be mentioned that care must be exercised that pallor be not mistaken for cyanosis, and that the character of the pulse be correctly appreciated.

Management.—For minor operations where pain is slight, narcosis may rather be aimed at than otherwise. The excellent state of the patient during the light anæsthesia, and the trifling nature of any subsequent vomiting, are advantageous.

From the majority of ordinary incisions, no harm accrues if the patient is not fully "under" at the moment.

In the case, however, of incisions in ultra-sensitive parts, or where important nerves are involved, serious cardiac inhibition may be produced if the anæsthesia be insufficient. Brisk facial stimulation, or, if this fail, the application of tongue forceps, almost always brings about the desired increase of respiration. If these do not avail, it is a wise precaution to ask the surgeon to make the incision slowly and gradually and cautiously to push the chloroform as the respiration becomes fuller and deeper. The danger that lies here must never be forgotten. In all probability there is an accumulation of chloroform in the respiratory area, and if to this be added a large amount on the mask, the increased respiration may in a second or two change the comparatively harmless narcosis into a grave, if not fatal, syncope.

In that type of narcosis occurring during the course of operations in non-sensitive parts, facial stimulation may be repeated as often as necessary. If no response takes place, the administration ought nevertheless to be continued, the chloroform being used sparingly and a careful watch kept for the

slightest sign of returning consciousness. If the administration be stopped, the patient very speedily and often quite unexpectedly "comes out," the anæsthesia, in spite of appearances, being very light. It must be remembered that one of the earliest signs of returning consciousness may be a further dilation of the already dilated pupils.

In profound narcosis, where all the signs are extremely well marked, no measures appear to be of any avail to stimulate the respiration. Even an extensive abdominal incision induces no response, and the condition persists and usually deepens with the course of the operation.

Such cases require merely a few whiffs of chloroform continuously, or at short intervals, to keep up the anæsthesia, particular watch being kept on the state of the pulse.

Any accumulation of fluid in the mouth should be attended to from time to time, otherwise the moment the patient is moved in any way it will run back into the larynx, and may cause troublesome spasm with its attendant difficulties.

Cases.—The following briefly annotated cases illustrate the practical bearing of the foregoing remarks:—

1. *Simulation of Surgical Anæsthesia.*—Healthy girl, aged 10. Operation for genu valgum. Some excitement and struggling at first; then narcosis came on somewhat rapidly. Pupils contracted; pupillary and corneal reflexes nil. Complete muscular relaxation. Respiration extremely shallow; slight cyanosis. Staring look well marked. Moved freely at incision—no ill-effects.

2. *Simulation of Surgical Anæsthesia.* — Florid, healthy looking young woman of 24. Operation on appendix. Passed quietly and gradually into narcosis. Pupils contracted, immobile, insensitive. Complete muscular relaxation. Respiration almost imperceptible; slight cyanosis. Moved freely at incision —no ill-effects.

Both these cases were regarded as properly "under," and therefore no test was applied before incision. In neither case did the incision cause any ill-effect.

3. *Narcosis during Course of Operation.*—Slight, somewhat anæmic girl of 18, declared healthy generally. Operation on appendix. Properly "under" at incision; a little later passed into following state. Pupils fully dilated; reflexes nil. Respiration extremely shallow, absent for seconds at a time. Cyanosis well marked. Pulse good. Operating surgeon, noting appearance of patient, requested chloroform to be stopped. In less than two minutes by the clock, patient, without least warning,

began to vomit and strain. This case is typical of what so frequently happens when the operative procedure is being carried on in a non-sensitive part, the reflex stimulation of the respiratory centre being absent. The character of the pulse points out clearly that the signs are not due to too much chloroform, but the exact contrary.

4. *Serious Cardiac Inhibition during Narcosis.*—Fairly healthy-looking child of 8. Heart apparently sound, pulse fairly good. Operation—amputation below knee. Child presented every appearance of surgical anæsthesia except a somewhat shallow respiration; no cyanosis; pulse fairly good. Surgeon made circular incision below knee, right down to the bone at one sweep. Immediately child took prolonged, high-pitched, crowing inspiration; pupils dilated to their utmost limit; intense pallor; pulse vanished at once. Two more crowing inspirations, and then respiration ceased. Prompt measures brought patient round; operation finished without any more chloroform. Considerable shock persisted for some time after operation. This case contrasts vividly with Nos. 1 and 2, and illustrates the difference between the effects of an ordinary and an extraordinary incision.

5. *Threatened Syncope from Overdose during Increased Respiration.*—Apparently healthy woman of 30. Operation—curetting of uterus. Narcosis obviously present, but patient gave no sign till dilating of cervix, then respiration markedly increased, and some movement; administrator (who was not the present writer) immediately poured about a drachm of chloroform on to the mask. In a few moments pupils dilated widely; pulse disappeared, respiration ceased. Artificial respiration brought patient round, and anæsthetic re-administered cautiously.

This case requires no comment; it points its own moral.

6. *Profound Narcosis.*—Stout, florid, healthy woman of 34. Operation for intra-abdominal tumour. Narcosis supervened almost from the start; all the signs extremely well marked. Respiration extremely shallow and at long intervals; pupils dilated; cyanosis excessive, patient's face dark blue in colour; no obstruction to respiration. Pulse very good. No kind of stimulation increased respiration in the least. Not the slightest movement at incision or during operation of 75 minutes; pulse kept good all the time. Whiffs of chloroform given continuously to prevent patient coming out, only 9 drachms required in all. After patient put back to bed, respiration steadily improved, and first act of vomiting dispelled narcotic state. Very little subsequent vomiting This case shows clearly that even in profound narcosis the heart is unaffected.

7. *Post-anæsthetic Narcosis.*—Middle-aged woman, said to

be healthy. Operation for internal hæmorrhoids. Alcoholic odour in breath; induction very violent; satisfactory anæsthesia during operation. After operation finished, respiration gradually diminished to the imperceptible; pupils contracted; reflexes nil; marked cyanosis; pulse very good. This state lasted for some time, then vomiting suddenly came on and the whole condition disappeared.

In conclusion, the writer craves indulgence for a certain diffusiveness and repetition almost unavoidable from the nature of the subject.

Births and Deaths registered in Eight of the Principal Towns of Scotland during August 1905

DURING the month of August 1905 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4090 living children, of whom 2009 were males and 2081 females. These births are equivalent to an annual birth-rate of 27.5 per thousand of the estimated population of these towns, a rate which is 1.4 less than that for July, and 2.0 less than that for August of last year. In Leith the birth-rate for the month was 34.0; in Greenock, 32.5; in Dundee, 30.6; in Glasgow, 28.0; in Aberdeen, 27.6; in Paisley, 25.7; in Edinburgh, 23.2; in Perth, 22.0. The births registered during the month are 208 fewer than in July, and 237 fewer than in August of last year.

Of the total births, 3783 were legitimate, and 307, or 7.5 per cent., were illegitimate. This illegitimate rate ranged from 8.7 in Aberdeen, and 8.5 in Dundee, to 3.1 in Perth. In Edinburgh it was 8; in Glasgow, 7.9; in Paisley, 4.8; in Leith, 4.7; and in Greenock, 4.6

Deaths registered in these towns during the month numbered 2124, of which 1081 were males and 1043 females. The equivalent annual death-rate per thousand was 14.3, a rate which is 0.5 less than that for July, and 2.4 less than that for August of last year. The actual number of deaths was 70 fewer than in July, and 328 fewer than in August of last year. The death-rates for the month ranged from 17.8 in Paisley, to 11.0 in Aberdeen. In Glasgow it was 15.0; in Greenock, 14.8; in Perth, 14.1; in Edinburgh, 14.0; in Dundee, 13.6; and in Leith, 13.6.

Of the 2124 deaths, 783, or 36.9 per cent., were of children

of less than five years old; and 501, or 23.6 per cent., were of persons of over sixty. Compared to the returns of July, deaths under five are 12 more, and those over sixty 15 fewer. Compared to the returns of the previous August, deaths under five are 176 fewer, and those over sixty are 36 fewer.

Deaths of children of less than one year old numbered 543, which is 72 more than in July, but 105 fewer than in August of last year. The infantile mortality per thousand births was 129, which is 17 more than that rate for July, but 22 fewer than that rate for August of last year. The infantile mortality for the month ranged from 155 in Paisley to 79 in Greenock. In Edinburgh it was 153; in Leith, 149; in Glasgow, 131; in Perth, 116; in Dundee, 107; and in Aberdeen, 101.

The principal epidemic diseases were the cause of 268 deaths, the equivalent annual death-rate from these causes being 1.8 per thousand, a rate which is 0.3 more than that in July, but 0.6 less than that in August of last year. This rate was highest in Paisley, 2.8; and lowest in Aberdeen, 0.7. In Perth it was 2.4; in Glasgow, 2.3; in Greenock, 2.0; in Dundee, 1.4; in Edinburgh, 1.2; and in Leith, 1.0.

There were no deaths from small-pox. Deaths from measles numbered 45; these were 22 fewer than in July, but 15 more than in August of last year. Deaths from whooping-cough numbered 63; and were 21 fewer than in July, but 49 fewer than in August of last year. Deaths from scarlet fever numbered 6; from diphtheria, 8; from enteric fever, 11; and from typhus fever, 1. Deaths from diarrhœas numbered 134, which is 80 more than in July, but 44 fewer than in August of last year.

Deaths from influenza numbered 3; from puerperal septic infection, 4; from malignant disease, 141, of which 85 were ascribed to carcinoma, 7 to sarcoma, and 49 to cancers not otherwise specified. Deaths from heart disease numbered 201; from apoplexies, 106; from premature birth debility, 77; and from alcoholism, 8.

Deaths from pneumonia numbered 124, and constituted 5.8 per cent. of the total deaths; while deaths from bronchitis numbered 67, and constituted 3.2 per cent. of the total deaths. Deaths from pneumonia were 49 fewer than in July, and 5 fewer than in August of last year; deaths from bronchitis were 32 fewer than in July, and 11 fewer than in August of last year.

Deaths from phthisis numbered 192, and constituted 9.0 per cent. of the total deaths; they were of the same number as in July, but 9 more than in August of last year.

Editorial Notes and News

The Sanitary Congress at Inverness.

SEVENTEEN years have elapsed since the Annual Congress of the Incorporated Sanitary Association of Scotland last met in Inverness. In his Presidential Address delivered at the opening of the Congress, on September 7, Dr M'Vail dealt with the changes which have taken place in Scotland in sanitary matters during that period. Although the period is a short one in the history of a people, he was able to describe these years as constituting for Scotland, and especially for rural Scotland, a period of sanitary revolution. Too short a time had elapsed to show the full effect of the reforms which had been carried out, but so far as could be ascertained they were very satisfactory. The city death-rates were now within measurable distance of the earlier country rates, and he believed these could be reached or passed if the same energy were to be devoted to the prevention of pollution of city air as had already been exhibited in some other sanitary directions.

Dr M'Vail went on to refer to the growing demand for socialistic legislation in various directions, to such demands as were indeed actually formulated and passed by resolution at the Trade Unions Congress at Hanley on the following day. The demand for free meals for school children, for free medical inspection and advice, naturally attracted much hysterical support, and the promulgation of various immature schemes. But the stern facts of the situation could not be set aside. It was good alike for individual, and municipality, and nation, and empire that the citizens should be healthy and numerous. But, as had been said a thousand times in recent discussions, the responsibility of the parent must not be set aside in endeavouring to help the child. One principle he strongly pleaded for. If the State was to take charge of underfed and badly housed and insufficiently clothed children, it must be given, and must accept, some very definite control over the parents of such children. It would not do to supplant every lazy and dissolute father in the function of rearing his offspring, unless he was at the same time forced to work up to his full capacity for work.

The medical inspection of school children came up for discussion on the second day of meeting, papers on the subject being read by Dr Leslie MacKenzie and Mr J. F. Tocher advocating such inspection, while Mr James Macdougall read a paper on the feeding of school children advocating that School Boards should have power to deal with the matter in conjunction with the Sanitary Authorities.

As a contrast to the very moderate tone of the speakers at Inverness, it will be of interest to quote the resolution referred to above which was unanimously passed by the Trade Unions Congress, a body which evidently has the courage of its opinions. This resolution declares the Congress in favour of "the principle of State maintenance of children, and urges, as a means of checking the evils in the report of the Committee on Physical Deterioration: (1) that immediate provision be made for giving at least one free meal a day to all school children; (2) that free medical advice and inspection be placed within the reach of all children; (3) that efficient physical training shall become a necessary feature of school life; (4) that the administration of the reforms indicated in the foregoing clauses shall in no way be associated with charity or the administration of the Poor Law; (5) that the Board of Education provide a statistical department charged with the collation and periodic publication of statistics relating to the health and mortality of school children; (6) that the Parliamentary Committee place these recommendations before all Municipal Councils in the kingdom; (7) that it be an instruction to the Parliamentary Committee of the Trade Unions Congress to incorporate these proposals in the Bill to be brought before Parliament during the forthcoming session; (8) that no Parliamentary candidate receive the endorsement of the Parliamentary Committee unless he is prepared to accept and promote the proposals contained in the foregoing paragraphs."

Medical Education in Scotland

In order to obtain in Scotland a legal qualification to practise medicine, the student must conform to the regulations of the General Medical Council; he must pass a preliminary examination recognised by the Council; must then register as a medical student; must study at a recognised medical school for a period of at least five years after registration; and having then obtained a registrable degree or diploma, this qualification must be recorded in the *Medical Register*.

Each University confers four registrable degrees: Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.)—which must be obtained and conferred at the same time, and which cannot be obtained until the candidate has attained the age of twenty-one years; Doctor of Medicine (M.D.); and Master of Surgery (Ch.M.). The three medical corporations, the Royal College of

Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Faculty of Physicians and Surgeons of Glasgow, co-operate in conducting conjoint examinations for the "Triple Qualification" (L.R.C.P.E., L.R.C.S.E., L.F.P.S.G.), which likewise admits to the *Medical Register*.

The Universities

PRELIMINARY EXAMINATION. — Each student must pass this examination before commencing medical study. At the matriculation office of each University, candidates can obtain schedules, which must be filled up and lodged not later than certain dates in March and September respectively. The fee for examination is 10s. 6d., and should be paid at the time of lodging the schedule. Candidates are examined on the following subjects:—

(1) *English.*—There is one paper comprising two questions on British History, two on Geography, four on Grammar (correction of sentences, parsing, analysis of sentences, and derivations), two of a literary and general nature, and the candidate has also to write an essay, and paraphrase a portion of verse. Answers are required to eight questions, and one answer in History, one in Geography, the essay, and the paraphrase are essential.

(2) *Latin.* — Translation, Parsing, Grammar, Prose Composition, and Sentences.

(3) *Elementary Mathematics.* — (*a*) Arithmetic (fractions, proportion, percentage, square root, and simple interest); (*b*) Algebra (fractions, factors, square root, equations of the first degree, simultaneous equations of the first degree, quadratic equations and problems leading thereto); (*c*) Geometry (Euclid, Books I., II. and III., or their equivalents, with simple deductions).

(4) *Greek, or French, or German.*

French or German.—Grammar, translation into English and into French or German, and short idiomatic sentences for translation from English.

Greek.—Grammar, translation into English, and of short sentences into Greek.

It is compulsory that the subjects be passed at not more than two examinations, but there is no restriction on the number of times the candidate may present himself for examination. A degree in Arts or Science in any University of the United Kingdom, and in any Colonial or Foreign University specially recognised, the Lower Grade Leaving

Certificate of the Scottish Education Department, and certain other examinations, are accepted as equivalents for the preliminary examination. The preliminary examination conducted by the Educational Institute of Scotland is not accepted as an equivalent examination.

MATRICULATION.—Having passed the preliminary examination, the student must, within fifteen days after the commencement of the session, make the required entries in the Matriculation Album of the University, and pay the matriculation fee, which is one guinea for the whole year, half a guinea for the summer session alone. The student must matriculate each year of study.

REGISTRATION.—Within fifteen days after commencement of study, he must register as a medical student. He must be not less than sixteen years of age, must have passed the preliminary examination, and must produce to the Registrar (James Robertson, Esq., 54 George Square, Edinburgh) an application form duly filled up, showing that he has commenced medical study.

THE CARNEGIE TRUST.—This Trust is prepared to pay the class fees of students (who have passed the University preliminary examination) for all classes, whether attended within the Universities or in any of the Extra-Mural Schools. The Trust is also prepared to pay the class fees for students proceeding to the Triple Qualification, provided that the applicant has passed the preliminary examination recognised by the Trust. It is also prepared to pay the fees for the various special classes given by many of the Lecturers upon advanced and non-compulsory subjects. Three qualifications are demanded: the applicant (1) must be over sixteen years of age; (2) must be of Scottish birth or extraction, or must have given two years' attendance after the age of fourteen at a school or institution under inspection of the Scottish Education Department; and (3) must be qualified by preliminary examination under the ordinances of the Scottish Universities Commission and the regulations of the Joint Board of Examiners, to attend the classes for which payment of fees has been claimed. Schedules of application for admission to the benefit of the Trust are obtainable by written application to the Secretary of the Trust, 14 Hanover Street, Edinburgh.

Professional Education at Edinburgh University

It is more advisable for the student to commence study at the beginning of the summer than of the winter session. The

student who commences in summer should attend the classes in the following sequence :—

First Summer.— Elementary Botany and Zoology.
Examination in these subjects in July.

First Winter.— Chemistry and Practical Chemistry.
Physics (three months' course).
Anatomy Lectures.
Examination in Chemistry, Practical Chemistry, and Physics in March.

Second Summer.—Practical Anatomy—Histology—Hospital.

Second Winter.— Physiology (Lectures, Practical Chemical and Practical Experimental Physiology), Practical Anatomy, Surgery,[1] Hospital and Clinical Surgery (after Christmas).

Third Summer.— Practical Anatomy, Practical Materia Medica, Clinical Surgery and Surgical Ward Work.

Third Winter.— Anatomy (Practical and Demonstrations), Materia Medica, Clinical Surgery, and Surgical Ward Work (up to Christmas).
Examination in Anatomy and Physiology in March.
Practical Pathology, Clinical Medicine and Medical Ward Work, Dispensary.
Examination in Materia Medica in July.

Fourth Winter.— Pathology, Post-Mortems, Practice of Medicine, Midwifery and Gynæcology, Clinical Medicine and Ward Work.
Examination in Pathology in March.

Fifth Summer.— Forensic Medicine, Public Health, Hospital and Clinical Medicine, Ophthalmology, Diseases of Children (or Larynx, Ear, and Nose, or Skin Diseases), Mental Diseases.

Fifth Winter and Final Summer.—
Hospital and Clinical Medicine, Dispensary.
Vaccination, Fevers, Practical Midwifery, Operative Surgery (in summer).
Examinations in Surgery and Clinical Surgery, Medicine and Clinical Medicine, Midwifery and Gynæcology, Forensic Medicine and Public Health in April, May, and June.

[1] Or in the third Winter Session.

If the student commences in winter, the course of study is as follows:—

First Winter.— Physics (three months), Chemistry and Practical Chemistry, Anatomy (Lectures and Practical).
Examination in Chemistry, Practical Chemistry, and Physics in March.

First Summer.— Elementary Botany and Zoology.
Examination in these subjects in July.

Second Winter.— Same as above-mentioned second winter.

Second Summer.—Same as above-mentioned third summer, with in addition Practical Physiology (Histology).

And thereafter as in the above-mentioned Winter and Summer Sessions.

The candidate must attend Hospital for not less than three years; must attend both Clinical Medicine and Clinical Surgery for a period of at least nine months; twelve cases of Midwifery, or six cases and three months' attendance at a Maternity Hospital; and Post-Mortem Examinations for three months.

Two of the five years of study must be spent at the University, and not less than eight of the compulsory subjects of study must be taken in the University.

The University degrees are now conferred on Women Students. They do not attend the classes in the University, but at the Medical College for Women, Minto House, which is recognised by the University Court as a Medical School whose courses of instruction qualify for graduation in medicine.

Professional Examinations for M.B. and Ch.B.

First Examination.— Botany, Zoology, Physics, and Chemistry.
Second Examination.—Anatomy, Physiology, Materia Medica, and Therapeutics.
Third Examination.—Pathology.
Final Examination.—Medicine and Clinical Medicine, Surgery and Clinical Surgery, Midwifery and Gynæcology, Forensic Medicine and Public Health.

The candidate may pass in one or more subjects of an examination, even though he fail in the other subjects. The minimum expense for M.B. and Ch.B., including fees for Classes, Hospital, Matriculation, and Examination, amounts to about £143.

Degree of M.D.

Each candidate for this degree, under the new regulations, must be of the age of twenty-four years or upwards, and must have obtained the degrees of M.B. and Ch.B. of the University. He must either have been engaged for two years in general practice, *or* for one year in the naval or military medical services, or in the medical wards of a hospital, or in scientific research. He must present a thesis written by himself on a medical subject, and pass an examination in Clinical Medicine. In this examination the candidate has to write a report and commentary on at least three cases, and has to show a practical knowledge in the applications of the ophthalmoscope, laryngoscope, electrical apparatus, and sphygmograph, in the examination of the blood, and in the chemical and microscopical examination of the excreta.

The candidate who has graduated M.B. and C.M. under the old regulations may either proceed to the degree of M.D. under the old regulations (under which he is not required to pass an examination in Clinical Medicine, but must have passed examinations in Greek and in Logic or Moral Philosophy), or he may proceed to the degree as if he had graduated M.B., Ch.B. under the new regulations.

Degree of Ch.M.

Each candidate must be not less than twenty-four years of age, must possess the degrees of M.B., Ch.B., must have attended the surgical wards of a hospital for one year, or have spent one year in scientific research or in the naval or military medical services, or two years in practice other than that restricted to medicine. He must submit a thesis on a surgical subject, and pass an examination on clinical surgery and its branches, surgical anatomy, and operations on the dead body.

Fees for M.D. and Ch.M.

The fee for the M.D. degree under the old regulations is five guineas; for the M.D. or Ch.M., under the new regulations, ten guineas. The candidate must have paid the matriculation fee for the year in which he presents himself for examination or graduation. At each reappearance for examination, under the new regulations, the fee is five guineas.

DEGREES IN PUBLIC HEALTH.

Two degrees are granted by the University of Edinburgh in the department of Sanitary Science, viz., B.Sc. and D.Sc.

Bachelor of Science.

Candidates must be graduates in Medicine of a University of the United Kingdom or of some other recognised University. In order to obtain the degree, two examinations have to be passed.

First Examination.—Before entering for this examination, the candidate must, after graduating in Medicine, have worked in a recognised Public Health Laboratory for eight months, of which five consecutive months must be passed in the Public Health Laboratory of the University of Edinburgh.

He must also have attended in a Scottish University a course of lectures on Physics and a course of lectures on Geology, extending over three months, and both of which are approved of by the University Court.

The subjects of examination are as follows:—

(1) *Laboratory* work—Practical, written, and oral; examination of water, air, foods, beverages, condiments, sewage; soils; disinfectants; building materials; clothing; bacteriology.
(2) Physics. (3) Geology.

Second Examination.—This cannot be taken until eighteen months after graduating in medicine; nor sooner than six months after passing the First B.Sc. Examination. The candidate must have attended two separate courses on Public Health, either in the University of Edinburgh or in some other recognised University or School.

Each course must consist of forty lectures, and includes Medicine in its relation to Public Health and Sanitary Engineering.

The candidate must likewise produce evidence that (1) for six months he has studied sanitary work under a Medical Officer of Health for a county or borough of not less than 25,000 inhabitants; (2) that he has studied clinically for three months infectious diseases in a recognised institution; (3) that for three months he has been instructed by a recognised teacher in mensuration and drawing.

The subjects of examination are:—

(1) Sanitation; (2) Sanitary Law; (3) Vital Statistics; (4) Medicine in relation to Public Health.

The candidate is examined orally, practically, and by a written paper. *Sanitation* includes making reports on dwellings, workshops, hospitals, and sanitary schemes.

The University Court may modify the work and instruction prescribed from time to time.

Doctor of Science.

A graduate after having held the degree of B.Sc. for five years may present himself for the D.Sc. He must present a thesis, or a published work or memoirs, the result of his own research, and must pass an examination in Public Health, and in such of its special subjects as the Senatus may determine. The candidate must submit the subject in which he proposes to be examined for approval not less than two months before the examination.

Fees Payable.—First and second examinations, £3, 3s. each; for D.Sc., £10, 10s.

Institutions for Clinical Instruction in Edinburgh

Royal Infirmary. 740 beds and 40 cots. Fees—perpetual ticket, £12; one year, £6, 6s.; six months, £4, 4s.; three months, £2, 2s. Clinical instruction is given daily in Medicine, Surgery, and all their special branches.

Royal Hospital for Sick Children. 120 beds. Hospital ticket, £1, 1s. Fee for Qualifying Course, £2, 2s.

City Hospital for Infectious Diseases. 600 beds. Fee, £1, 1s.

Royal Maternity and Simpson Memorial Hospital. 40 beds. The Maternity Residency affords accommodation for twelve students.

Royal Asylum, Morningside. 500 beds.

The fee for a qualifying course at each of these last two institutions is £2, 2s.

Victoria Hospital for Consumption and Diseases of the Chest, 50 beds. Out-Patient Department at 26 Lauriston Place.

Eye, Ear, and Throat Infirmary. 6 beds; 2700 Out-Patients yearly. Fee for three months, £1, 1s.

Royal, New Town, Medical Missionary (Cowgate), Western, Provident (Marshall Street), Eye and Skin Dispensaries.

Professors and Lecturers in Edinburgh

The courses given by the Extra-Mural Lecturers are recognised by the University and other examining boards as qualifying for graduation.

Botany— Professor Bayley Balfour, M.D., Botanical Gardens.
J. A. Terras, B.Sc., New School.

Zoology— Professor J. Cossar Ewart, M.D., University.
Malcolm Laurie, D.Sc., Surgeons' Hall.
Marion I. Newbigin, D.Sc., Minto House.

Biology— Malcolm Laurie, D.Sc., Surgeons' Hall.
Marion I. Newbigin, D.Sc., Medical College for Women, Minto House.

Physics— Professor J. G. MacGregor, D.Sc., University.
C. G. Knott, D.Sc., University.
Dawson Turner, M.D., Surgeons' Hall.

Chemistry— Professor Crum Brown, M.D., University.
J. Falconer King, F.C.S., Minto House.
G. H. Gemmell, F.I.C., 4 Lindsay Place.
James Kerr, B.Sc., Surgeons' Hall.
T. W. Drinkwater, Ph.D., 5 Teviot Place.

Anatomy— Professor D. J. Cunningham, M.D., University.
J. Ryland Whitaker, M.B., Surgeons' Hall.
R. J. A. Berry, M.D., New School.

Applied Anatomy—
H. J. Stiles, M.B., University.
J. Ryland Whitaker, M.B., Surgeons' Hall.
R. J. A. Berry, M.D., New School.

Physiology— Professor E. A. Schäfer, LL.D., University.
D. Noël Paton, M.D., Surgeons' Hall.

Chemical Physiology—
Professor E. A. Schäfer, LL.D., University.
D. Noël Paton, M.D., Surgeons' Hall.

Experimental Physiology—
D. Noël Paton, M.D., Surgeons' Hall.
Sutherland Simpson, M.D., University.

Histology— D. Noël Paton, M.D., Surgeons' Hall.
P. T. Herring, M.D., University.

Materia Medica and Therapeutics—
Professor Sir Thomas R. Fraser, M.D., University.
William Craig, M.D., Surgeons' Hall.
William Wood, M.B., 27 Nicolson Square.

Pathology— Professor W. S. Greenfield, M.D., University.
W. Russell, M.D., Medical College for Women.
Theodore Shennan, M.D., Surgeons' Hall.
Stuart M'Donald, M.B., New School.

Surgery— Professor J. Chiene, C.B., M.D., University.
F. M. Caird, F.R.C.S., New School.
J. W. B. Hodsdon, F.R.C.S., Surgeons' Hall.
H. Alexis Thomson, F.R.C.S, Minto House.

David Wallace, C.M.G., F.R.C.S., Nicolson Square.
Alex. Miles, F.R.C.S., New School.
J. W. Dowden, F.R.C.S., Medical College for Women.
A. A. Scot Skirving, C.M.G., F.R.C.S., 27 Nicolson Square.

Clinical Surgery—
Professor Annandale, F.R.C.S., Royal Infirmary.
C. W. MacGillivray, F.R.C.S., „
J. M. Cotterill, F.R.C.S., „
C. W. Cathcart, F.R.C.S., „
F. M. Caird, F.R.C.S., „

Practice of Medicine—
Professor J. Wyllie, M.D., University.
Alex. James, M.D., New School.
Byrom Bramwell, M.D., New School.
G. A. Gibson, M.D., Minto House.
Alex. Bruce, M.D., Surgeons' Hall.
R. W. Philip, M.D., New School.
R. A. Fleming, M.D., 27 Nicolson Square.

Clinical Medicine—
The Physicians of the Royal Infirmary.

Midwifery and Gynæcology—
Sir J. Halliday Croom, M.D., Minto House.
D. Berry Hart, M.D., Surgeons' Hall.
J. W. Ballantyne, M.D., Surgeons' Hall.
A. H. F. Barbour, M.D., New School.
F. W. N. Haultain, M.D., New School.
J. Haig Ferguson, M.D., New School.
W. Fordyce, M.D., New School.
J. Lamond Lackie, M.D., Minto House.

Insanity— T. S. Clouston, M.D., University and Royal Asylum.
Sir J. Batty Tuke, M.D., and G. M. Robertson, M.D., Surgeons' Hall and Stirling District Asylum, Larbert.

Diseases of the Eye—
G. Mackay, M.D., University and Royal Infirmary.
W. G. Sym, M.D., Royal Infirmary.
A. H. H. Sinclair, M.D. (Ophthalmoscopy), 45 Lauriston Place.

Vaccination—J. B. Buist, M.D., Western and Cowgate Dispensaries.
Francis Cadell, M.B., Marshall Street and New Town Dispensaries.

Diseases of Children—
Staff of the Sick Children's Hospital.

Diseases of the Skin—
W. Allan Jamieson, M.D., Royal Infirmary.
Norman Walker, M.D., Royal Infirmary.

Diseases of the Ear, Nose, and Throat—
R. McKenzie Johnston, M.D., Royal Infirmary.
A. Logan Turner, M.D., Surgeons' Hall.
J. Malcolm Farquharson, M.B., New School.

Forensic Medicine—
Professor Sir Henry D. Littlejohn, M.D., University.
Harvey Littlejohn, F.R.C.S., Surgeons' Hall.
W. G. Aitchison Robertson, M.D., New School.

Public Health—
Professor C. Hunter Stewart, M.B., University.
W. G. Aitchison Robertson, M.D., D.Sc., New School.
C. J. Lewis, M.D., D.Sc., Minto House.

Fevers— J. O. Affleck, M.D., City Hospital.
C. B. Ker, M.D., Surgeons' Hall.

Bacteriology.—J. M. Beattie, M.D., University.
T. Shennan, M.D., Surgeons' Hall.
J. Taylor Grant, M.D., 4 Lindsay Place.
Stuart M'Donald, M.B., New School.

Diseases of Tropical Climates—
A. Davidson, M.D., University.
Major D. G. Marshall, I.M.S., Surgeons' Hall.

Practical Medicine and Physical Diagnosis—
R. W. Philip, M.D., and G. Lovell Gulland, M.D., New School.
R. A. Fleming, M.D., Nicolson Square.
F. D. Boyd, C.M.G., M.D., Surgeons' Hall.

Neurology— J. J. Graham Brown, M.D., New School.

Diseases of the Chest—
R. W. Philip, M.D., 26 Lauriston Place.
G. Lovell Gulland, M.D., 26 Lauriston Place.

Medical Electricity and Röntgen Rays—
Dawson Turner, M.D., Surgeons' Hall.

Practical Gynæcology—
N. T. Brewis, M.D., 5 Cambridge Street.
J. Haig Ferguson, M.D., Leith Hospital.
Diseases of the Blood—
G. Lovell Gulland, M.D., Surgeons' Hall.

Glasgow University

The medical curriculum at the University extends over five years, and the classes are held in the handsome buildings at Gilmorehill, adjacent to which lies the Western Infirmary, where there is an excellent field for clinical and practical work.

The Faculty of Medicine embraces the classes of Botany, Zoology, Physics, Chemistry, Anatomy, Embryology, Physiology, Materia Medica and Therapeutics, Pathology, Medical Jurisprudence and Public Health, Surgery, Clinical Surgery, Practice of Medicine, Clinical Medicine, Midwifery, Insanity, Diseases of the Eye, Diseases of the Ear, Diseases of the Throat and Nose, Diseases of the Skin, and Diseases of Children.

The cost of the medical curriculum is about £126.

Before the commencement of medical and surgical studies the preliminary examination has to be passed. The names of candidates for this examination must be given in and the fee of 10s. 6d. paid to the assistant clerk at the Matriculation Office. At the Matriculation Office successful students can obtain the registration forms, which must be filled up and sent to 54 George Square, Edinburgh.

The University of Glasgow offers many attractions to students. The professional chairs are occupied by able men, some of them of world-wide renown; and in the Western Infirmary, with the recent additions to its surgical theatres and its excellent pathological laboratories and museum, a splendid field of observation is open to the student. There are also extremely good opportunities for practical work in the various dispensaries of the city, in the Maternity Hospital with its large out-door department, and also at the Royal Hospital for Sick Children, the Eye Infirmary, and the Royal Asylum at Gartnavel.

The Students' Union, situated in the University grounds, is very convenient, and much taken advantage of.

Lodgings are to be found all round the neighbourhood, so that the whole life of the student, his work and his recreation, is drawn into a small circle, within which he can move as busily and as profitably to himself as in any teaching school in the kingdom.

A students' magazine is usually issued weekly during the session, and has a successful circulation amongst all the students at Gilmorehill. For medical students there is a Medico-Chirurgical Society for debating purposes.

Queen Margaret College for Women

In February 1892 the Universities Commission issued an ordinance empowering the Scottish University Courts to make provision, within the Universities, for instruction of women. The Council of Queen Margaret College, in consideration of this provision, made over their work to the University. The "Queen Margaret College" survives now as the part of the University which is devoted to the education of women.

A full course of medicine and surgery is obtainable. The regulations, fees, etc., are similar to those for men. The buildings are pleasantly situated in grounds of their own, close to the Botanic Gardens. The newly-built anatomical department is excellently arranged and most complete. Clinical work is amply provided for in the Royal Infirmary and its Dispensaries, and in the Royal Hospital for Sick Children, the Glasgow Maternity Hospital, the Royal Asylum of Gartnavel, and the Belvidere Fever Hospital. There are also arrangements for special study and research.

Students can have board and lodging at Queen Margaret Hall, within easy reach of the College, at the rate of about one guinea per week for each week of the session. The school is flourishing and largely attended. There is a winter session commencing in October and a summer session in April.

All information necessary can be obtained from Miss Galloway, Queen Margaret College, Glasgow.

St Mungo's College Medical School

86 Castle Street, Glasgow (within the Grounds of the Glasgow Royal Infirmary)

St Mungo's College was the outcome of the Royal Infirmary Medical School which was opened in 1876. The venerable Infirmary has now actively existed for one hundred and six years, and the students of St Mungo have peculiarly good opportunities for practical and clinical work in the wards and dispensaries. To the Royal Infirmary a large number of accidents are admitted, and numerous medical cases of all kinds; and for students, and more especially for house-surgeons

and house-physicians, the practical experience is abundant. St Mungo's College buildings are attached to the Dispensary and adjacent to the Infirmary. The winter session opens in October, and there is always a summer session from April to July. All information regarding classes, fees, etc., can be obtained from the Dean, St Mungo's College, 86 Castle Street. The classes are for male students only. The class-rooms and laboratories have accommodation for 300 or 400 students. The anatomical department consists of large, well-lighted dissecting-rooms, a lecture-room, and osteology gallery and museum. There are also chemical, physiological, zoological, and botanical laboratories. In the adjacent dispensaries fully 40,000 patients are seen yearly. Students can also have access to the well-equipped Pathological Museum and Laboratory of the Infirmary, and the bacteriological department.

The electrical department of the hospital is one of the best in the country, while a complete Electric Light installation, including a powerful educational lantern, was added to the equipment of the College during the past session.

The bursaries are few in number, but the class fees are moderate, averaging two guineas for a winter course, while the combined theoretical and practical courses of anatomy, zoology, physiology and pathology are four guineas each.

A Public Health Laboratory is also open to students for a complete course in practical work, and there are two lectureships on this subject, so that those who desire may conform to the new regulations of the Medical Council and the requirements of the examining board. Excellent instruction in fevers can be obtained at Ruchill and Belvidere Hospitals. Dressers and clerks are chosen from the students for work in the wards of the Infirmary. The close proximity of the Maternity Hospital, Rottenrow, affords excellent opportunities for clinical demonstrations, which form a considerable and unique addition to the ordinary course of systematic instruction in midwifery.

LECTURES AND DEMONSTRATIONS.

WINTER SESSION.

Elementary Physics—Professor Blyth.
Chemistry—Professor A. W. C. Menzies.
Zoology—Professor King.
Practical Zoology—Professor King.
Senior Anatomy—Professor Alex. Macphail.
Junior Anatomy—Professor Alex. Macphail.
Practical Anatomy—Professor Alex. Macphail.
Surgery—Professor Henry E. Clark.

Physiology—Professor Farquharson.
Clinical Surgery—Professor D. N. Knox.
Practice of Medicine—Professor T. K. Monro.
Clinical Medicine—Professor D. C. M'Vail.
Materia Medica—Professor Dougall.
Pathology—Professor Workman.
Midwifery—Professor Robert Jardine.
Ophthalmology—Professor Maitland Ramsay.
Gynæcology—Dr James K. Kelly.
Throat and Nose—Dr Fullerton.
Public Health Laboratory—Professor Ga
Public Health—Professor Galt.

Bacteriology, if desired. *Hospital Dispensary*, daily.

SUMMER SESSION.

Practical Pathology—Professor Workman.
Botany—Professor Jas. Swanson.
Practical Botany—Professor Jas. Swanson.
Practical Chemistry—Professor A. W. C. Menzies.
Practical Physiology—Professor Farquharson.
Clinical Surgery—Professor D. N. Knox.
Operative Surgery—Professor Henry E. Clark.
Surgical Diseases of Children—Dr James A. Adams.
Clinical Medicine—Professor D. C. M'Vail.
Anatomy—Professor Alex. Macphail.
Demonstrations—Professor Alex. Macphail.
Practical Anatomy—Professor Alex. Macphail.
Osteology—Professor Alex. Macphail.
Forensic Medicine and Hygiene—Professor Galt.
Dermatology—Dr Alex. Morton.
Otology—Dr J. Kerr Love.
Bacteriology—Dr David M'Crorie.
Psychological Medicine—Dr Hamilton C. Marr.
Hospital Dispensary, daily.

Anderson's College Medical School

Dumbarton Road, Partick, Glasgow

The old institution known as "Anderson's University" was founded by John Anderson, M.A., F.R.S., in 1726, and the medical school connected therewith dates back to the year 1800.

In 1877 the name of the Institution was altered from

"Anderson's University" to "Anderson's College." In 1887 the medical school of Anderson's College became a distinct Institution known as "Anderson's College Medical School."

The new buildings are situated in Dumbarton Road, immediately to the west of the entrance of the Western Infirmary and four minutes' walk from the University. They are constructed on the best modern principles, and are provided with all the appliances requisite for the conduct and management of a fully equipped medical school.

Classes are conducted in all the subjects of the five years' curriculum :—

Anatomy—Professor A. M. Buchanan, M.A., M.D.
Physics—Professor Peter Bennett.
Chemistry—Professor J. Robertson Watson, M.A.
Botany—Professor B. G. Cormack, M.A., B.Sc.
Zoology—Professor Geo. Bell Todd, M.B.
Physiology—Professor Robert Fullarton, M.A., M.B.
Materia Medica—Chair vacant.
Medical Jurisprudence and Hygiene—Professor Carstairs Douglas, B.Sc., M.D., F.R.S.E.
Midwifery—Professor John Edgar, M.A., B.Sc., M.B.
Surgery—Professor J. H. Nicoll, M.B.
Practice of Medicine—Professor R. Barclay Ness, M.A., M.B.
Ophthalmic Medicine and Surgery—T. Spence Meighan, M.B.
Aural Surgery—James Galbraith Connal, M.B.
Diseases of Throat and Nose—John Macintyre, M.B., F.R.S.E.
Mental Diseases—John Carswell, F.F.P.S.G.
Public Health Laboratory—Professor Carstairs Douglas, B.Sc., M.D., F.R.S.E.
Pathology—At the Western or Royal Infirmary.

Degrees and diplomas—Certificates of attendance on the classes at Anderson's College Medical School are received by the Universities of London and Durham, by the Royal University of Ireland, and by all the Royal Colleges and Licensing Boards in the United Kingdom. They are also recognised by the Universities of Glasgow and Edinburgh under certain conditions which are stated in the calendar of this school. The Public Health Laboratory Course is recognised as qualifying for the Diploma granted by the University of Cambridge and by the Scottish Conjoint Board.

Candidates for the Licence in Dental Surgery can obtain at this school the full medical curriculum which is required. The courses special to dentistry are conducted at the Glasgow Dental School, 15 Dalhousie Street.

Malcolm Kerr Bursary in Anatomy. Value about £10.

Open to students of the junior anatomy class during session 1904-1905.

The Carnegie Trust will pay the fees of students at Anderson's, on conditions, regarding which particulars may be obtained from W. S. M'Cormick, LL.D., Carnegie Trust Offices, Edinburgh.

Class fees.—For each course of lectures (anatomy, ophthalmic medicine and surgery, aural surgery, diseases of throat and nose and mental diseases excepted): first session, £2, 2s.; second session (in Anderson's College), £1, 1s.; afterwards free. For practical classes (except anatomy), viz., chemistry, botany, zoology, physiology, pharmacy, operative surgery: first session, £2, 2s.; second session, £2, 2s.

Reduced joint fees in zoology and in botany, for lectures and practical class when taken in same summer session, £3, 3s.; for either course separately, £2, 2s.

Anatomy class fees.—Winter—first session (including practical anatomy), £4, 4s.; second session (including practical anatomy), £4, 4s.; third session, £2, 2s.

Summer—lectures and practical anatomy, £2, 12s. 6d.; lectures alone, £1, 11s. 6d.; practical anatomy alone, £1, 11s. 6d., osteology and practical anatomy, £2, 12s. 6d.; osteology alone, £1, 11s. 6d.; practical anatomy alone, £1, 11s. 6d.

Ophthalmic medicine and surgery (including hospital practice), *Aural surgery, Diseases of throat and nose, and Mental diseases*, £1, 1s.

Matriculation fee.—Winter, 10s.; for summer session only, 5s.

Aberdeen University

The course of study for the degree of M.B., Ch.B. extends over five years, of which two at least must be spent in the University of Aberdeen.

The curriculum is the same as in the other Scottish Universities as far as relates to attendance on University classes, to clinical study at a General Hospital, to attendance on courses of Clinical Surgery, Clinical Medicine, Mental Diseases, and Practical Pharmacy, to instruction in Vaccination, to attendance on Cases of Labour, and to the practice of a Dispensary.

The candidate must also, before admission to the final examination, produce the following certificates:—

(1) That he has acted as clerk in the Medical and Dresser in the Surgical Wards of a Public Hospital, each for a period equivalent to one Winter Session.

(2) That he has been present at not fewer than twenty-five

post-mortem examinations at a Hospital or Dispensary, some of which he must have taken part in performing.

(3) That he has attended for at least three months the practice of a General Fever Hospital with not fewer than forty beds.

(4) That he has attended for at least three months a course of clinical instruction in the Diseases of Children.

(5) That he has attended for at least three months the Ophthalmological practice of a Hospital or Dispensary, where special provision is made for giving instruction.

Certificates for these various classes and courses must attest not only regular attendance, but also due performance of the work.

There is no prescribed order of study, but a scheme, representing the minimum curriculum, has been drawn up for the guidance of students, and is printed in the Calendar.

The following are the Classes in the Medical Faculty :—

WINTER SESSION.

Zoology—Professor John Arthur Thomson, M.A.
Chemistry—Professor Japp, M.A., LL.D., F.R.S.
Anatomy—Professor Reid, M.D., F.R.C.S.
Practical Anatomy—Professor Reid and Assistants.
Physiology (*Syst. and Pract.*)—Professor M'William, M.D.
Materia Medica—Professor Cash, M.D., F.R.S.
Pathology (*Syst. and Pract.*)—Professor Hamilton, M.B., F.R.C.S., F.R.S.E.
Surgery—Professor Ogston, C.M., M.D.
Medicine—Professor Finlay, B.A., M.D., F.R.C.P. Lond.
Midwifery and Diseases of Women and Children—Professor Stephenson, M.D., F.R.C.S.

SUMMER SESSION.

Botany—Professor Trail, M.A., M.D., F.L.S., F.R.S.
Practical Botany—Professor Trail.
Zoology—Professor Thomson.
Practical Zoology—Professor Thomson.
Physics—Professor Niven, M.A., D.Sc., F.R.S.
Practical Chemistry—Professor Japp and Assistants.
Practical Anatomy—Professor Reid and Assistants.
Practical Materia Medica and Pharmacy—Professor Cash and Assistants.
Physiology (*Syst. and Pract.*)—Professor MacWilliam.
Forensic Medicine—Professor Hay, M.D.
Practical Hygiene and Forensic Medicine—Professor Hay.

Pathology (*Syst. and Pract.*)—Professor Hamilton.
Practical Midwifery and Gynæcology and Clinical Diseases of Children—Professor Stephenson.
Tropical Medicine—Dr G. A. Maconachie, Lecturer.

Systematic and Practical Pathology, and Systematic and Practical Physiology respectively are now taught as part of one continuous course, occupying a whole academic year, *i.e.* a summer and a winter session.

There are Assistants to the Professors in the Medical Faculty appointed annually, two in the department of Anatomy, Physiology, Materia Medica, and Chemistry, and one in each of the other departments.

The following are recognised as Lecturers—

Lecturer on	Mental Diseases .	Wm. Reid, M.D.
„	Ophthalmology . .	C. H. Usher, M.B., B.S., F.R.C.S.
„	Vaccination . .	R. G. M'Kerron, M.A., M.D.
„	Skin Diseases . .	J. F. Christie, M.A., M.B., C.M.
„	Diseases of Ear, Throat, and Nose . .	J. Mackenzie Booth, M.D., C.M.
„	Ophthalmology . .	A. Rudolph Galloway, M.A., M.B., C.M.

All the University Classes are held at Marischal College.

Tutorial Classes are held in connection with most of the Systematic Courses, and practical instruction is given in the fully-equipped Laboratories connected with the several departments.

Graduates or others desirous of engaging in special study or research may be allowed by the Senatus to work in any of the Laboratories. Such Research Students are exempted from payment of Laboratory Fees (*v. infra*), but must matriculate each year, paying the ordinary Matriculation Fee.

Fees for Ordinary Laboratory Course—

For six hours a week (winter session) .	£3	3	0
Each additional hour . . .	0	10	6
For nine hours a week (summer session)	3	3	0
Each additional hour . . .	0	7	0
Or, For one month (all day) . .	4	4	0
„ two months („) . .	7	7	0
„ three „ („) . .	10	10	0

The Matriculation Fee must be paid in addition.

General clinical instruction is obtained in the following Medical Institutions:—

The Royal Infirmary of Aberdeen.

This General Hospital, situated about seven minutes' walk from Marischal College, has been recently constructed on the most modern principles, and is fully equipped with all the requirements for medical work and teaching. It accommodates upwards of two hundred patients; the number of patients admitted during the year 1903 was 2906, and the number of out-patients treated during the same period was 12,489.

Four resident medical officers are appointed annually, two in May and two in August, to hold office for twelve months. Salary, £25 with board.

Fees.—Perpetual fee to hospital practice, £6, or first year £3, 10s., second year £3, afterwards free; clerkship in medicine, £1, 1s.; dressership in surgery, £1, 1s.; pathological demonstrations, £2, 2s. (Special courses of lectures are charged for.)

Royal Hospital for Sick Children.

It is situated about five minutes' walk from Marischal College.

It accommodates over 80 patients. The number of patients admitted in 1904 was 720, and the number of out-patients treated 1652. No infectious disease except diphtheria is treated.

Each student must act as clerk for six weeks in the medical and surgical wards respectively.

There is one qualified house physician and surgeon (resident) who holds office for six months. Salary at the rate of £25 per annum.

Fee for hospital practice, £2, 2s. first year; subsequent years, £1, 1s.

Royal Asylum.

It is situated about fifteen minutes' walk from Marischal College. It accommodates over 950 patients, and has been recently fitted up with a fully equipped hospital and a laboratory.

The senior physician is recognised by the University as lecturer on mental diseases, and delivers a qualifying course of lectures.

The City (Fever) Hospital.

It is situated about ten minutes' walk from Marischal College, and accommodates 100 patients.

Senior students are admitted for instruction in fevers twice a week under the visiting physician (who is the Medical Officer of Health for the City) and his assistant. Fee, £1, 1s.

General Dispensary, Maternity Hospital, and Vaccine Institution.

It is situated about five minutes' walk from Marischal College.

The total number of cases treated during 1904 was 12,892, and the number of patients treated at their own homes, 3239. There were 379 midwifery cases.

Fees.—Perpetual Fee, £3, 3s.; vaccination certificate and instruction, £1, 1s.; for special courses, *v. supra.*

Ophthalmic Institution.

This institution is situated about three minutes' walk from Marischal College. The surgeon in charge is recognised by the University as a lecturer on ophthalmology.

During 1903, 50 in-patients and 3680 out-patients were treated.

PROFESSIONAL EXAMINATIONS.

I. Degrees of M.B., Ch.B.

There are four examinations: the subjects and regulations of these are common to all the Scottish Universities.

II. Degree of M.D.

The regulations are common to all the Scottish Universities.

The candidates must be M.B., Ch.B. of Aberdeen University, and twenty-four years of age or upwards.

He must submit a thesis composed by himself, and pass an examination in clinical medicine.

The following are special regulations with regard to the clinical examination:—

The examination is both written and oral, and consists of the following divisions:—

Part I. (*a*) A written report on one or more clinical cases examined by the candidate.

(*b*) An oral and practical examination at the bedside. Candidates must be able to use the laryngoscope and ophthalmoscope, so far as they are required in medical cases.

Part II. The candidates must show a high proficiency in a special department selected by himself, *e.g.* Obstetrics, Mental Diseases, Zymotic Diseases, or other departments approved by the Senatus.

Part III. A commentary in writing on a case or cases, a statement of the particulars of which will be submitted to the candidate.

(For dates of submission of thesis, payment of fees, etc., *v.* degree of C.M.)

III. Degree of C.M.

The regulations are common to all the Scottish Universities.

The candidate must be M.B., Ch.B. of Aberdeen University, and twenty-four years of age or upwards.

He must submit a thesis composed by himself, and pass an examination, of which the following are the special regulations:—

The examination is written, oral, and practical, and consists of the following divisions:—

Part I. (*a*) A written report on one or more clinical cases examined by the candidate.

(*b*) An oral and practical examination on cases.

Candidates must be familiar with the use of instruments required in investigating diseases of the eye, ear, and throat.

Part II. An examination in surgical anatomy and operations on the cadaver.

Each candidate for the degree of C.M. or M.D. must lodge his thesis (accompanied by a signed declaration that the work has been done and the thesis composed by himself) with the Dean of the Faculty of Medicine not later than 1st February for the spring graduation, or 1st June for the summer graduation. He shall at the same time intimate the special department of clinical examination (M.D.) for which he wishes to enter, and pay the necessary fee.

The fee for the degree of M.D. or C.M. is £10, 10s. (exclusive of any stamp duty); re-examination fee is £2, 2s.

IV. Diploma in Public Health (D.P.H.).

The diploma is conferred, after special instruction and examination, on anyone who has been at least twelve months a graduate in medicine of a university in the United Kingdom; if not a graduate of Aberdeen University, the candidate must attend a course of instruction in this University in one or more subjects embraced in the examination for the diploma.

Each candidate must have attended a course of instruction in Public Health.

The qualifying post-graduate instruction embraces:—

(*a*) Regular attendance, for three months, at a hospital for infectious diseases, at which opportunities are afforded for the study of methods of administration.

(*β*) Daily association for a period of six months (of which at least three months must be distinct from the period of laboratory instruction) in the duty, routine and special, of Public Health Administration, under the supervision of a recognised Medical Officer of Health.

(*γ*) Practical instruction, for at least six months, in laboratory work, which includes examination of water, air, soil, and foods, and the study of bacteriology, disinfection, ventilation, water supply, and sewerage, and the framing of reports of analysis. The laboratory attendance must extend over at least fifteen hours a week.

The qualifying courses of laboratory instruction in Aberdeen University are given in the Public Health Laboratory (Fee, £6, 6s.), and the Bacteriological Laboratory (Fee, £4, 4s.).

The diploma is conferred after an examination in March and July of each year.

The examination is written, oral and practical, and is divided into two parts.

Part I. embraces the following subjects in their application to Public Health:—

(*a*) Physics, Engineering, and Meteorology.

(*β*) Chemistry, Microscopy, and Bacteriology.

Part II. embraces:—

(*a*) General Hygiene.

(*β*) Sanitary Law and Vital Statistics.

Part I. may be taken alone, or both parts together.

The written examinations occupy two days, and the oral and laboratory and outdoor examination three to four days.

Candidates must send in their names and pay the fees a fortnight before the examination. Examination fee is five guineas. Re-examination fee one guinea.

SUMMARY OF FEES.

I. University Fees.

(*a*) Preliminary Examination (each occasion)	£0	10	6
(*β*) Matriculation—For whole year	1	1	0
For Summer Session	0	10	6

(γ) Class Fees—				
Each Systematic Course—For winter or Full Course . .			£4	4 0
Each subsequent attendance .			3	3 0
For Summer or Half-Course .			3	3 0
Each subsequent attendance .			3	3 0
Each Practical Course and sub. attendance .			3	3 0
Except { Practical Anatomy in Summer .			2	2 0
Except { Practical Midwifery . .			2	2 0
(δ) Degree Fees—For M.B., Ch.B.—				
1st Professional Exam.	£5	5 0		
2nd „ „	5	5 0		
3rd „ „	5	5 0		
4th „ „	7	7 0		
			23	2 0
Re-examination fee for not more than two subjects			1	1 0
„ for each additional subject .			0	10 6
For M.D.			10	10 0
For Ch.M.			10	10 0
Re-examination Fee			2	2 0

II. Non-University Fees.

Royal Infirmary—Perpetual Fee . . .	6	0	0
Children's Hospital	2	2	0
Dispensary—Perpetual Fee	3	3	0
City (Fever) Hospital	1	1	0
Lectures on clinical medicine—Winter Session .	4	4	0
„ „ „ Summer „ .	3	3	0
„ clinical surgery—Winter Session .	4	4	0
„ „ „ Summer „ .	3	3	0
Clerkship at Royal Infirmary . . .	1	1	0
Dressership „ „	1	1	0
Course of Lectures on { Mental diseases; Tropical Medicine; Diseases of eye; Diseases of ear and throat; Diseases of skin } Each	2	2	0
Instruction in { Clinical gynæcology; Medical electricity; Anæsthetics; Dental surgery; Post-mortem room }			
Instruction in vaccination	1	1	0

The cost of matriculation, class, and hospital fees for the whole curriculum, exclusive of fees for degrees, is usually about £120.

University of St Andrews

The medical degrees are the same as those of the other Scottish universities, and they are granted under similar conditions. The graduation fees for the degree of M.B., Ch.B. amount to twenty-two guineas, and for M.D. or Ch.M. ten guineas.

United College, St Andrews, affords considerable facilities to students beginning a medical course, especially if they are willing to combine it with a preliminary two years of study for an Arts or Science degree. Under the new regulations, which make it possible to study botany, zoology, chemistry, and physics as part of the course for an M.A. degree, the medical student can, during the early years of his medical course, hold some of the many bursaries or scholarships which the University of St Andrews has to offer. For women, the large number of Taylour Thomson bursaries, to which female medical students have a preference, makes the course in St Andrews specially advantageous. There are several £20 bursaries for men. The cost of rooms and living is considerably under that in the larger towns. For women there is an excellent residential hall, and other students may attend the common dinners in the Union. The medical course in St Andrews extends over two years, and embraces all the subjects of the first two professional examinations. The other subjects must be studied elsewhere, but the student may take all the examinations in the University and graduate there. There are special buildings for the Medical School.

University College, Dundee, supplies a complete course of medical study, whether the student graduate at the University (St Andrews) or not. Several bursaries are offered for competition among the medical students. Large and commodious new buildings for this medical school, with well equipped laboratories and dissecting room, afford ample scope for study. Besides that supervision of individual students which larger schools cannot offer, there are unrivalled opportunities for clinical and outpatient work in the Royal Infirmary. Already this institution is provided with over 300 beds, including special wards for obstetrics, gynæcology, children's diseases, ophthalmology, and other special departments.

In addition to this, a large building is in process of construction, which will provide an additional 120 beds and

quarters for special research. There is a large outdoor maternity department, and there are dispensaries which are largely attended in the various districts of the city.

The large asylum at Liff provides material for instruction in mental diseases, and the epidemic hospital for that in fevers. There is also the Royal Victoria Hospital where patients suffering from incurable diseases can be visited.

The classes at the United College, St Andrews, are:— Natural philosophy; practical physics; chemistry; practical chemistry; natural history; practical zoology (when taken along with the ordinary classes the fee for each of these three practical classes is £1, 1s.); botany; practical botany; physiology; anatomy; practical anatomy; materia medica; practical materia medica.

ST ANDREWS.

PROFESSORS AND LECTURERS.

Physics —Professor Butler.
Chemistry —Professor Purdie.
Zoology— Professor Mackintosh.
Botany Lecturer—
Mr R. A. Robertson.
Physiology—Dr Harris.
Anatomy Lecturer—
Professor Musgrove.
Materia Medica—
Professor Marshall.

At University College, Dundee, full courses in medicine and in public health are given as follows:—

DUNDEE UNIVERSITY COLLEGE.

PROFESSORS AND LECTURERS.

Physics— Professor Kuenen.
Chemistry— Professor Walker.
Zoology— Professor D'Arcy W. Thompson, C.B.
Botany— Professor Geddes.
Physiology—Professor Waymouth Reid.
Anatomy— Principal Yule Mackay.
Surgery, Systematic and Operative—
Professor MacEwan.

Surgery, Clinical—
Professor MacEwan.
Mr D. M. Greig.
Medicine, Systematic—
Professor Stalker.
Medicine, Clinical—
Professor Stalker.
Dr Mackie Whyte.
Materia Medica—
Professor Marshall.
Pathology— Professor Sutherland.
Midwifery and Diseases of Women—
Professor Kynoch.
Midwifery and Diseases of Women, Clinical—
Professor Kynoch.
Dr R. C. Buist.
Forensic Medicine—
C. Templeman, M.D., D.Sc., M.O.H.
Ophthalmology—
A. M'Gillivray, M.D.
Mental Diseases—
J. Rorie, M.D.
Diseases of Ear and Throat—
G. T. Guild, M.B.
Vaccination—
R. C. Buist, M.D.

Qualifications given by the Scottish Colleges

The Royal College of Physicians of Edinburgh, The Royal College of Surgeons of Edinburgh, and the Faculty of Physicians and Surgeons of Glasgow, conjointly confer the Triple Qualification (L.R.C.P.E., L.R.C.S.E., L.F.P.S.G.). Female candidates are admitted to the examinations for this qualification, the Regulations being the same for candidates of either sex.

PRELIMINARY EXAMINATION.—This examination must be passed before the Student commences professional study. It may be passed before any of the Boards recognised by the General Medical Council, and enumerated in the Regulations of the Colleges. The Educational Institute of Scotland conducts a qualifying Preliminary examination for medical students, in Edinburgh and Glasgow, on behalf of the Colleges. This examination embraces English, Latin, Mathematics, and either Greek, French, German, Italian, or other modern language. All the subjects must be passed at one time. Further particulars

are obtainable from S. M. Murray, Esq., 40 Princes Street, Edinburgh, or from Hugh Dickie, Esq., LL.D., Secretary to the Board of Examiners, Henrietta Street, Girvan.

REGISTRATION.—This is essential; the Regulations have been already given.

PROFESSIONAL EDUCATION. — The curriculum must extend over five years. Graduates in Arts or Science of any recognised University who have spent a year in the study of Physics, Chemistry, and Biology, and have passed an examination in these subjects for the degrees in question, are exempted from the first year of study. The fifth year of study should be devoted to clinical work in one or more recognised Hospitals or Dispensaries, and to the study of special diseases; but the student may pass six months of the fifth year as a pupil to a registered practitioner deemed capable by the committee of management. For information regarding the payment of class fees by the Carnegie Trust, *vide* p. 323.

ORDER OF STUDY WHICH IS RECOMMENDED.

First Summer.— Physics and Elementary Biology.
First Winter.— Five months' course in Chemistry and Anatomy; three months' course in Practical Chemistry; Practical Anatomy.
Second Summer.—Practical Anatomy; Histology.
Second Winter.— Practical Anatomy; Physiology—Five months' course.
Third Summer.— Three months' course in Pathology, Materia Medica, and Practical Materia Medica; Surgical Hospital Practice.
Third Winter.— Six months' course in Surgery and Clinical Surgery; Attendance at Surgical Wards.
Fourth Summer.—Three months' course in Midwifery and Gynæcology, in Medical Jurisprudence and Public Health, and in Clinical Surgery; Hospital Practice.
Fourth Winter.— Six months' course in Medicine and Clinical Medicine; Hospital Practice.
Fifth Summer.— Three months at Clinical Medicine; Hospital; Insanity; Diseases of Children; Diseases of Eye.
Practical Midwifery—Personal attendance on twelve cases under the supervision of a medical practitioner, *or* three months'

attendance at a Lying-in Hospital and personal attendance on six cases.

Fifth Winter.— Hospital Practice; Fevers; Dispensary; Vaccination; Skin Diseases; Ear and Throat Diseases.

PROFESSIONAL EXAMINATIONS.—Four of these are held during the curriculum. Each is held quarterly in Edinburgh and twice a year in Glasgow. Candidates may go up for all the subjects of the first Professional examination at once, or may enter for and pass in any division of subjects. A higher percentage of marks is required, however, from candidates entering for such divisions. Candidates are advised to enter for the entire examination; they must enter for *all* the subjects of the second, third, and final examinations.

First Examination.— Physics, Chemistry, and Elementary Biology. This should be passed before the beginning of the second winter session.

Second Examination.—Anatomy, Physiology, including Histology. This should be passed at the end of the second year of study.

Third Examination.— Pathology, Materia Medica, and Pharmacy. This should be taken at the end of the third year.

Final Examination.— Can only be taken at the end of the fifth year. The candidate must have attained the age of twenty-one.

It includes:—

1. Medicine, Therapeutics, Medical Anatomy, Clinical Medicine.
2. Surgery, Surgical Anatomy, Clinical Surgery, Diseases of the Eye.
3. Midwifery and Diseases of Women and New-born Children.
4. Medical Jurisprudence and Public Health.

FEES FOR PROFESSIONAL EXAMINATIONS.

For each of the first three, £5; for the final, £15. The minimum total expense, inclusive of fees for classes and examinations, amounts to £115.

DIPLOMA IN PUBLIC HEALTH OF THE ROYAL COLLEGES.

The Diploma is granted by the Triple Qualification Board.

1. Every candidate for examination must have held a registrable medical qualification for one year.

2. After obtaining such qualification, he must have attended during six months a recognised Laboratory in which Chemistry, Bacteriology, and the Pathology of the Diseases of Animals transmissible to man are taught; and the certificate must show that the candidate has conducted analyses of air, water, sewage, and foods.

3. After obtaining a medical qualification he must during six months have been engaged in acquiring a practical knowledge of the duties of Public Health Administration, under the supervision of—

(*a*) In England or Wales, the Medical Officer of Health of a County or single sanitary District having a population of not less than 50,000, or a Medical Officer of Health devoting his whole time to Public Health work; or

(*b*) In Scotland or Ireland the Medical Officer of Health of a County or District or Districts with a population of not less than 30,000; or

(*c*) A Medical Officer of Health who is also a teacher in the Department of Public Health in a recognised medical school.

(*d*) A Sanitary Staff Officer of the Royal Army Medical Corps having charge of an Army Corps, District, or Command, recognised for the purpose by the General Medical Council.

4. After obtaining a medical qualification he must have attended for three months the practice of a Hospital for Infectious Diseases.

There are *Two Examinations.* The first includes—(*a*) Laboratory work, with Chemistry and Bacteriology; (*b*) Physics; (*c*) Meteorology.

The Second Examination embraces—(*a*) Report on premises visited; (*b*) Examination at Fever Hospital; (*c*) Examination at Public Abattoir; (*d*) Epidemiology and Endemiology; (*e*) Vital Statistics and Sanitary Law; (*f*) Practical Sanitation.

Each examination is held bi-annually, in October and May. The fee for each is £6, 6s.; for re-examination, £3, 3s. Fees and applications to be lodged with Mr JAMES ROBERTSON, 54 George Square, Edinburgh; or with Mr ALEX. DUNCAN, LL.D., 242 St Vincent Street, Glasgow.

Membership and Fellowship of the Royal College of Physicians, Edinburgh.

Every applicant for the *Membership* must possess a recognised qualification, and be not less than twenty-four years of age. He must pass an examination on Medicine and Therapeutics, on Clinical Medicine, and on some special Department of Medicine, such as Psychological Medicine, Pathology, Medical Jurisprudence, Public Health, Midwifery, Gynæcology, Neurology, Diseases of Children, Tropical Medicine, etc. Having passed this examination the Membership is conferred by election.

The fee for the Membership is thirty-five guineas, except the applicant be a Licentiate of the College, when it is twenty guineas.

Members of not less than three years' standing may be raised by election to the *Fellowship*, the fee being thirty-eight guineas, exclusive of Stamp Duty of £25.

Fellowship of the Royal College of Surgeons, Edinburgh.

Every candidate must be twenty-five years of age, and must have been engaged for two years in the practice of his profession after having obtained a recognised qualification in Surgery. The petition for examination must be signed by two Fellows—a proposer and seconder.

The candidate must pass an examination on Surgery, Surgical Anatomy, Operative and Clinical Surgery, and one optional subject, for example, Ophthalmology, Aural, Nasal, and Laryngeal Surgery, Cerebro-Spinal, Abdominal, Gynæcological, Orthopædic, Dental, Venereal and Genito-Urinary Surgery, Advanced Anatomy or Physiology, Surgical Pathology and Morbid Anatomy, Midwifery, Gynæcology, Medical Jurisprudence and Public Health.

The fees amount to £45. If the candidate be a Licentiate of the College the fee is £30. Further particulars may be obtained from Mr James Robertson, Clerk to the College, 54 George Square, Edinburgh.

Fellowship of the Faculty of Physicians and Surgeons of Glasgow.

Every candidate must have been qualified for two years, and be aged twenty-four. Admission to the Fellowship is by examination and subsequent election. The candidate is examined on either (*a*) Medicine (including Clinical Medicine, Medical

Pathology, and Therapeutics), or (*b*) Surgery (including Clinical Surgery, Operative Surgery, Surgical Anatomy, and Surgical Pathology); and on one optional subject—Anatomy, Physiology, Pathology, Midwifery, Diseases of Women, Medical Jurisprudence, Ophthalmic Surgery, Aural, Laryngeal, and Nasal Surgery, Dental Surgery, State Medicine, Psychological Medicine, or Dermatology.

The fee is £30, except the candidate be a Licentiate of the Faculty, when it is £15.

Medical Education of Women in Edinburgh

MEDICAL COLLEGE FOR WOMEN, MINTO HOUSE.

This College is recognised by the University Court and the Triple Qualification Board as a Medical School, whose courses of instruction qualify for graduation in Medicine. The curriculum and class fees are the same as for male students proceeding to the University Degree or College Qualification respectively. Clinical tuition is provided in the Royal Infirmary.

The prospectus of the College, and any information regarding the medical education of women in Edinburgh, may be obtained from Miss MACKAY, Secretary, Medical College for Women, Minto House, Edinburgh, who will be glad to furnish lists of lodgings to intending students.

Post-Graduation Study

The Scottish Medical Schools afford at present few facilities for post-graduation study as compared with London and some of the Medical Schools on the Continent, but the classes of bacteriology, diseases of the blood, diseases of the tropics, neurology, etc., are usually attended by a considerable number of graduates.

The different University Laboratories provide facilities for research work. In most cases no fees are charged, but those engaged in research work are expected to defray the expense of materials. The Laboratory of the Royal College of Physicians of Edinburgh is splendidly equipped for the carrying out of all branches of medical research. It is available for research work to members and fellows of the Royal Colleges of Edinburgh and to other applicants approved by the Council of the Royal

College of Physicians. No fees are charged and the ordinary reagents, etc., are provided. By arrangement with the Superintendent, workers may have the assistance of members of the Laboratory Staff.

THE ROYAL NAVY MEDICAL SERVICE

A CANDIDATE must be between 21 and 28 years of age. He must declare: (1) his age, and date and place of birth; (2) that he is of pure European descent, the son either of natural born British subjects or of parents naturalised in the United Kingdom; (3) that he labours under no mental or constitutional weakness; (4) that he is ready to engage for general service at home or abroad; (5) that he is registered under the Medical Acts as duly qualified professionally, and what diplomas, etc., he holds. Copies of the Regulations for the entry of candidates for commissions will be furnished on application to the Medical Director-General, Admiralty, 18 Victoria Street, London, S.W.

The entrance examination consists of two parts. Part I.—*Compulsory*—(*a*) Medicine (including Materia Medica, Therapeutics, and Hygiene), 1200 marks; (*b*) Surgery and Surgical Anatomy, 1200 marks. A competent knowledge of Operative Surgery is essential. Part II.—*Voluntary*—consisting of two divisions: (*a*) French and German (300 marks each); (*b*) Natural Sciences—not more than two of the following subjects—Zoology, Botany, Chemistry, Physiology, Geology, and Physical Geography (300 marks each).

Successful candidates, immediately after passing this examination, will receive commissions as surgeons in the Royal Navy, and will undergo a course of practical instruction in Naval Hygiene, the diseases of warm climates, etc., at Haslar Hospital.

Full Pay (*yearly*).—Surgeon (on entry), £255, 10s.; after four years' full-pay service, £310, 5s.; after eight years' full-pay service, or on promotion to Staff-surgeon, £365; after twelve years' service, £438; Fleet-surgeons (on promotion), £492, 15s.; after four years' full-pay service in that rank, £547, 10s.; after eight years' full-pay service, £602, 5s.; after twelve years' service, £657; Deputy Inspector-General, £766, 10s.; Inspector-General, £1300.

Allowances.—The senior medical officer of ships bearing the flag of flag officers commanding foreign stations and the Channel receives an allowance of 5s. a day. An allowance of 2s. 6d. a day may be granted to the senior medical officer of

ships bearing the flag of flag officers not commanding stations or fleets and to ships flying the broad pennant of commodores. Medical officers conducting the course of instruction at Haslar Hospital receive the following allowances:—The two senior officers employed on this duty, £150 a year each; the junior officer assisting, £50 a year; the junior officer instructing the sick berth staff, £50 a year. The following charge allowances may be granted to medical officers in charge of hospital ships: if above the rank of Fleet-surgeons, 5s. a day; if of the rank of Fleet-surgeon or junior, 3s. 6d. a day. Hospital allowances for naval medical officers at home and abroad, in lieu of provisions for themselves and servants, and for fuel and lights, are as follows: Deputy Inspector-Generals, at home, £67: abroad, £112; Fleet or Staff-surgeons, at home, £53; abroad, £112; Surgeons, at home, £39; abroad, £108.

Half Pay (*per diem*).—Surgeons under two years' full pay service, 6s.; after two years' full-pay service, 7s.; after four years' full-pay service, 8s.; after six years, 9s.; after eight years, 10s.; after ten years, 11s. Staff-surgeon on promotion, 12s.; after fourteen years, 13s.; after sixteen years, and on promotion to fleet-surgeon, 14s.; after eighteen years, 15s.; after twenty years, 17s.; after twenty-two years, 18s.; and after twenty-four years, 20s. Deputy Inspector-General on promotion, 25s.; after two years' full-pay service in rank, 27s.; after four years, 29s. Inspector-General, 38s.

Every medical officer will be required to undergo a post-graduate course of three months' duration at a metropolitan hospital once in every eight years. While carrying out this course, he will be borne on a ship's books for full pay and will be granted lodging and provision allowances and travelling expenses. The fees for each course (not exceeding £25) will be paid by the Admiralty. The medical officer will be required to produce separate certificates of efficient attendance in (1) the medical and surgical practice of the hospital; (2) a course of operative surgery on the dead body; (3) a course of bacteriology; (4) a course of ophthalmic surgery, particular attention being paid to the diagnosis of errors of refraction; (5) a practical course of skiagraphy.

ROYAL ARMY MEDICAL CORPS

SINCE the recent introduction of improvements in the conditions of service, the Royal Army Medical Corps offers a much more attractive career to a young graduate than formerly. These improvements include the possibility of accelerated promotion

by examination, the granting of study leave, the recognition of ability in special branches and increased pay.

The Journal of the Royal Army Medical Corps is an attractive monthly magazine, containing contributions from officers in the service. Many articles embodying original work of high value have already appeared.

The conditions of service are as follows:—

A candidate for a commission must be 21 years of age, and not over 28 years of age at the date of commencement of the entrance examination. He must possess a registrable qualification to practise. Regulations, forms of application and declaration may be obtained on application to the Director-General, Army Medical Service, 68 Victoria Street, London, S.W. The Dean of the candidate's medical school will be requested to render a confidential report as to the candidate's character, conduct, professional ability and fitness. The candidate may subsequently be allowed to compete for a commission, having been previously examined as to physical fitness by a Medical Board.

The *Entrance Examination* (held twice a year, usually in January and July) is of a clinical and practical character, partly written, and partly oral, marks being allotted under the following scheme:—

	Maximum Marks.
MEDICINE (written).	
A. Examination and report upon a medical case in the wards of a hospital	125
B. Commentary upon a case in medicine	125
MEDICINE (oral).	
A. Clinical cases; clinical pathology	75
B. Morbid anatomy and morbid histology	75
SURGERY (written).	
A. Examination and report upon a surgical case in the wards of a hospital	125
B. Commentary upon a case in surgery	125
SURGERY (Oral).	
A. Clinical cases, including diseases of the eye; surgical instruments and appliances	75
B. Operative surgery and surgical anatomy	75
Total marks	800

Having gained a place in this entrance examination, the successful candidates will undergo two months' instruction in hygiene and bacteriology, after which they will be examined in these subjects. On completion of this course, lieutenants on probation will proceed to the Depôt of the Royal Army Medical Corps at Aldershot for a three months' course of instruction in the technical duties of the Corps, and at the end of the course will be examined in the subjects taught.

EXAMINATIONS FOR PROMOTION.

Lieutenant before promotion to Captain (for Lieutenants appointed after March 31st, 1901). This examination may be taken at any time after completing eighteen months' service. The subjects of the examination are: (1) regimental duties; (2) drill; (3) military law; (4) duties and accounts connected with military hospitals and their supplies; (5) other duties of executive medical officers.

Captains before promotion to Majors (for Captains promoted to that rank after July 27th, 1895). This examination may be taken at any time after completing five years' service, after terminating a period of special study. The subjects of the examination are: medicine, including specific fevers, surgery, including skiagraphy, hygiene, bacteriology, and tropical diseases, and one special subject from the subjoined list, to which additions may from time to time be made—bacteriology (including the preparation of antitoxins), dental surgery, dermatology, midwifery and gynæcology, advanced operative surgery, ophthalmology, otology, including laryngology and rhinology, psychological medicine, State medicine.

Majors for promotion to Lieutenant-Colonel (for Majors promoted to that rank after March 31st, 1895). This examination may be taken at any time after three years in the rank of Major. The subjects of this examination are: (1) military law; (2) army medical organisation; (3) sanitation of towns, camps, transports, etc., epidemiology and the management of epidemics; (4) the laws and customs of war in relation to the sick and wounded; (5) one special subject, *e.g.* (*a*) medical history of important campaigns; (*b*) a general knowledge of the army medical services of other powers.

PAY. *At Headquarters.*	Inclusive of all allowances except field and travelling allowances. Yearly.
Director-General	£2000
Deputy Director-General . . .	1500
Assistant Director General . . .	850
Deputy Assistant Director-General . .	750

At other Stations.	Exclusive of allowances. Daily. £ s. d.
Surgeon-General	3 0 0
Colonel	2 0 0
Lieutenant-Colonel	1 10 0
„ „ specially selected for increased pay after at least 8 years' service abroad	1 15 0
Major	1 3 6
„ after 3 years' service as such	1 6 0
Captain	0 15 6
„ after 7 years' total full-pay service	0 17 0
„ „ 10 „ „ „ „	1 1 0
Lieutenant on probation and Lieutenant	0 14 0

Adjutant of the Royal Army Medical Corps (Volunteer)—the pay of his rank.

Additional Pay.

Officer not serving on the Headquarters Staff appointed a member of the Advisory Board	£150 a year.
Officer serving as Secretary of the Advisory Board and Nursing Staff	£100 a year.
Officer under the rank of Lieutenant-Colonel holding an appointment as Specialist	2s. 6d. daily.
Quarter-Master in charge of Medical Stores at Woolwich	2s. 6d. daily.

Charge Pay.

(*a*) Officer in charge of a general or other hospital, or of a division of a general hospital—

	Daily. s. d.
If in charge of at least 50 beds	2 6
„ „ „ 100 „	5 0
„ „ „ 200 „	7 6
„ „ „ 300 „	10 0
(*b*) Officer in command of the Depôt, Royal Army Medical Corps	5 0

Retired Pay.

	Yearly.
Director-General (after three years' service in the appointment, and 30 years' service)	£1125
	Daily. £ s. d.
Surgeon-General	2 0 0
Colonel	1 15 0

Lieutenant-Colonel, or Surgeon-Lieutenant-Colonel of the Household Troops—	
After 20 years' service . . .	£1 0 0
„ 25 „ „ . . .	1 2 6
„ 30 „ „ . . .	1 5 0
Lieutenant-Colonel, after having been in receipt of the increased pay (5s. a day) for 3 years; or Brigade-Surgeon-Lieutenant-Colonel of the Household Troops—	
Under 30 years' service . . .	1 7 6
After 30 „ „ . . .	1 10 0
Major, or Surgeon-Major of the Household Troops—	
After 20 years' service . . .	1 0 0
After 25 years' service, if his service reckoning for promotion is insufficient to qualify him for promotion to the rank of Lieutenant-Colonel . .	1 2 6
Major or Captain—	Gratuity.
After 5 years' service in the rank of Captain	£1000
After 10 years' service, if the officer was commissioned before the date of the Warrant	1250
After 3 years' service in the rank of Major	1800
After 6 years' service in the rank of Major	2500
Surgeon-Lieutenant-Colonel or Surgeon-Major of the Household Troops—	
After 15 years' service . . .	1800
„ 18 „ „ . . .	2500
Retirement shall be compulsory at the following ages:—	
Surgeon-General	60
Colonel, promoted to the rank on or after the date of the Warrant . .	57
Colonel, promoted to the rank before the date of the Warrant . . .	60
Other Officers	55

INDIAN MEDICAL SERVICE

CANDIDATES must be natural born subjects of His Majesty, between 21 and 28 years of age at the date of the examination, of sound bodily health, and in the opinion of the Secretary of State for India in Council, in all respects suitable to hold commissions in the Indian Medical Service. The candidate must

show proof of age, a recommendation to the effect that he is of regular and steady habits, a certificate of moral character, certificate of registration under the Medical Acts, a certificate of having attended a course of instruction for not less than three months at an ophthalmic hospital, or the ophthalmic department of a general hospital.

The physical fitness of each candidate will be determined by a Board of Medical Officers.

On proving possession of the foregoing qualifications, the candidate will be examined in the following subjects:

	Maximum Marks obtainable.
1. Medicine, including Therapeutics . .	1200
2. Surgery, including Diseases of the Eye .	1200
3. Applied Anatomy and Physiology .	600
4. Pathology and Bacteriology . .	900
5. Midwifery and Diseases of Women and Children	600
6. Chemistry, Pharmacy, and *either* Botany *or* Zoology	600

After passing this examination, the successful candidate will be required to attend one entire course of practical instruction of not less than four months' duration at the Army Medical School and elsewhere in (1) Hygiene; (2) Clinical and Military Medicine; (3) Clinical and Military Surgery; (4) Pathology of diseases and injuries incidental to military service. During the period of instruction each candidate will receive an allowance of 14s. per diem, with quarters, or with the usual allowances of a subaltern in lieu thereof. At the conclusion of the course, candidates will be required to pass an examination in the subjects taught during the course.

Pay and Promotion.

The rate of pay drawn by a Lieutenant previous to arrival in India is 14s. a day, but a Lieutenant who has been permitted by the Secretary of State to hold a hospital appointment will receive no pay while holding it.

A Lieutenant may be promoted to Captain on completion of three years' full-pay service from date of first commission; but after completing eighteen months' service, and before promotion to the rank of Captain, he will be required to pass an examination in military law and military medical organisation, the result of which may affect his promotion.

A Captain is promoted to Major on completion of twelve years' full-pay service.

A Major is promoted to Lieutenant-Colonel on completion of twenty years' full-pay service.

All promotions from the rank of Lieutenant-Colonel to that of Colonel, and from the rank of Colonel to that of Surgeon-General are given by selection for ability and merit.

PAY.

The following are the monthly rates of Indian pay drawn by Officers of the Indian Medical Service from the date of their arrival in India:—

Rank.	Unemployed Pay.	Grade Pay.	Staff Pay.	In Officiating Medical Charge of a Regiment.	In Permanent Medical Charge of a Regiment.
	Rs.	Rs.	Rs.	Rs.	Rs.
Lieutenant	420	350	150	425	500
Captain	475	400	150	425	550
„ after 5 years' service .	475	450	150	545	600
„ after 7 years' service .	—	500	150	575	650
„ after 10 years' service .	—	550	150	625	700
Major	—	650	150	725	800
„ after 15 years' service .	—	750	150	825	900
Lieutenant-Colonel . .	—	900	350	1075	1250
„ „ after 25 years' service	—	900	400	1100	1300
Lieutenant-Colonel specially selected for increased pay .	—	1000	400	1200	1400

The principal administrative appointments are held by Colonels and Surgeon-Generals on the following consolidated salaries:—

Colonels, from Rs.	1800	to	Rs. 2250	per mensem.
Surgeon-General	2	@	Rs. 2200	„
„	2	@	Rs. 2500	„
„	1	@	Rs. 3000	„

Specialist pay at the rate of Rs. 60 a month is granted to officers below the rank of Lieutenant-Colonel who may be appointed to certain posts.

The salaries of other substantive medical appointments in the Civil and Military Departments are consolidated, and vary from Rs. 400 to Rs. 1800 per mensem.

Qualified Officers of the Medical Service are also eligible for appointments in the Assay Department. The salaries of these appointments are from Rs. 600 to Rs. 2250 per mensem.

Officers are required to perform two years' regimental duty

in India before they can be considered eligible for civil employment.

Except in the administrative grades, and in certain special appointments, medical officers are not debarred from taking private practice. No officer, however employed, can receive any staff allowance unless he has passed the examination in Hindustani known as the "Lower standard."

Retiring Pensions and Half-Pay

Officers of the Indian Medical Service may retire on the following scale of pension :—

	Per annum.
After 30 years' service for pension . .	£700
„ 25 „ „ „ . . .	500
„ 20 „ „ „ . . .	400
„ 17 „ „ „ . . .	300

All officers of the rank of Lieutenant-Colonel and Major are placed on the Retired List when they have attained the age of 55 years, and all Surgeon-Generals and Colonels when they have attained the age of 60 years.

Officers placed on temporary or permanent half-pay are granted the British rate of half-pay of their military rank as under :—

Rank.	Rates of Half-pay. Per diem.		Per annum.		
	s.	*d.*	£	*s.*	*d.*
Lieutenant-Colonel . .	11	0	200	15	0
Major	9	6	173	7	6
Captain	7	0	127	15	0
Lieutenant . . .	3	0	54	15	0

MEDICAL APPOINTMENTS IN THE COLONIES

Applicants for medical appointments in British Guiana, Jamaica, Trinidad, and Tobago, Windward Islands, Leeward Islands, British Honduras, Fiji, Ceylon, Straits Settlements, Sierra Leone, Gambia, Gold Coast, Lagos, Northern and Southern Nigeria, Malay States, Hong Kong, Mauritius, Scychelles, Gibraltar, Cyprus, St Helena and the Falkland Islands, must be between 23 and 30 years of age, must be doubly qualified, and preference will be shown towards those who have held resident hospital appointments. Applications for medical appointments should be sent to the Assistant Private Secretary, Colonial Office.

Information regarding medical appointments in Cape Colony

and Natal can be obtained on application to the Agent-General to the Cape, 100 Victoria Street, London, S.W., and the Agent-General for Natal, 26 Victoria Street, London, S.W.

Medical appointments in Rhodesia are made by the British South Africa Company, 2 London Wall Buildings, E.C.; those in the Transvaal and Orange River Colonies are made on the recommendation of the Governors of these Colonies.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

By W. E. FOGGIE, M.A., M.B.,
Assistant-Physician, Dundee Royal Infirmary

PERIPHERAL PARALYSIS—SOME RARER VARIETIES

AMONGST the various forms of peripheral paralysis there are few of greater interest and clinical suggestiveness than those which occur in the course of pregnancy, labour and the puerperium. They are well worthy of study, as from being on the borderland of two special departments their general claims are apt to be overlooked. This whole subject has recently been considered in detail by v. Hoesslin (*Münch. med. Woch.*, No. 14, April 4, 1905). He thinks that both from a pathological, as well as from a clinical standpoint, these forms of peripheral paralysis may be naturally divided into (1) myopathic and (2) neuritic.

Under the *myopathic*, the chief type is that due to osteomalacia. The difficulties in locomotion, etc., which occur in this disease can in no way, either pathological or clinical, find their explanation in compression of the cord or of the nerve plexuses, but must be referred to muscular disease, which owes its origin to a like cause as the bony disturbance. The affected muscles show a fatty degeneration of their substance, atrophy of the striped muscle fibres, and simultaneous increase of the muscular nuclei. In advanced cases there is a complete lipomatosis. Various symptoms which point to muscular disease may occur prior to the bony change. The grouping of the affected muscles is extremely characteristic. At first the large muscles of the pelvic girdle are attacked—the ileo psoas, the quadriceps, and the adductors of the thigh—and in consequence thereof one gets the peculiar gait. In like manner in the upper limbs it is especially

the shoulder girdle group which first suffers. In both upper and lower limbs it is only exceptionally that the distal muscles take part in the disease. The whole clinical grouping shows a very close relationship with the juvenile form of progressive muscular dystrophy, except that pseudo-hypertrophy only rarely develops and that the reflexes are here increased. The treatment of course is in great part that of the underlying disease.

There is also another and rarer form of myopathic disease, viz. polymyositis.

The *neuritic* paralyses may be divided as follows:—(1) Traumatic neuritis; (2) Neuritis puerperalis per contiguitatem; (3) Neuritis puerperalis post-infectiosa; and (4) Toxic neuritis.

(1) *Traumatic neuritis* is marked by very definite symptoms. It begins either during or immediately after labour. It occurs chiefly in cases of severe labour, thus especially in pelvic contraction where there is every chance of pressure being exercised on the nerve plexuses during the passage of the child. Its frequent occurrence after the use of forceps is not specially due to instruments, but rather to the conditions which call for their use. Primiparæ, and of these elderly primiparæ, are the most likely to show this paralysis. The extent of the paralysis depends on the anatomical relations of the nerves in the pelvis. The lumbo-sacral cord as the most exposed part generally suffers most, and of its fibres it is mainly those which form the external popliteal nerve that bear the brunt. This statement as to the isolated paralysis of this nerve has thus gone the round of the text-books, but more detailed examination shows that the resulting paralysis is a much more varied one. From the shooting pains along various nerves which occur with the labour pains, one may pass on to occasional paralysis in the crural, sciatic, or other nerves, and even to conditions which lead to complete paraplegia. Usually these initial paralyses disappear in the course of several weeks or months and only leave behind a residual paralysis of the muscles supplied by the external popliteal nerve, a paralysis of an intractable character with atrophy, reaction of degeneration, and maybe club-foot. The prevalent opinion regarding an isolated involvement of this nerve has thus arisen from it alone being involved in cases seen long after the other signs of wider damage have cleared away. Further details as to the exact paralysis of the muscles supplied by this nerve are given by Herzog (*Deutsch. Archiv für klin. Med.*, Bd. 83, H. 112, 1 and 2, 1905), who gives a very full account of a case. The condition was as usual unilateral and affected especially the extensors of the toes and the tibialis anticus, but only to a slight extent the peronei.

(2) *Neuritis puerperalis per contiguitatem* arises either from

pressure of inflammatory products or from extension of inflammation to neighbouring nerves. It is especially apt to follow large parametritic exudations. The paralysis is not so complete as in the preceding form. The development depends on that of the causal disease and the course is conditioned by the management of the underlying inflammation.

(3) *Neuritis puerperalis post-infectiosa* occurs not only after severe septic and pyæmic infections, but much more frequently after cases with only a moderate degree of fever. It has a most definite localisation, viz. in the median and ulnar nerves in the upper extremities. Scarcely any neuritis has so definite a selective action. It develops mostly in the first weeks after birth, has the usual course and results of a degenerative neuritis, and generally terminates in a satisfactory recovery.

(4) *Toxic neuritis.*—The neuritis of pregnancy and the normal puerperium. This neuritis frequently (36 times out of 92 cases) begins during pregnancy and develops fully after its completion. While it may be due to infectious diseases or to the presence of a dead fœtus, it is in general the result of toxæmia. The frequent co-existence of hyperemesis gravidarum, itself a symptom of auto-intoxication, lends weight to this view. In its clinical course it has very many points in common with alcoholic neuritis, especially in its pseudo-tabetic and psychical complications. The symptoms are extremely varied. There is no definite type as in the post-infectious forms, as there may be all possible combinations. In about half of the cases there is present a general polyneuritis with severe symmetrical muscular atrophies of all the limbs. These severe forms have frequently suffered previously from hyperemesis, and are also those most likely to show mental complications. The prognosis is more unfavourable where the paralyses are widespread and rapid in their development but at the same time, if the person survive, all the paralytic symptoms and even the mental confusion may disappear. Premature induction of labour, which naturally seems called for in cases occurring during pregnancy, cannot be trusted to bring about an arrest of the neuritis, as there is frequently an exacerbation of the neuritic symptoms after the completion of labour. It should only be recommended in cases where there are dangerous symptoms developing.

SURGERY

By L. TURTON PRICE, M.B., Ch.B.

TORSION OF THE OMENTUM

IN *The American Journal of Medical Sciences* for August, is a paper on this subject by Messrs Corner and Pinches of St Thomas' Hospital, London. In it they record 4 cases of their own, and collect 49 cases which have previously been reported by other observers. The following is an abstract from their paper.

The first case was recorded by Oberst in 1882, and the second in 1893 by Demons. Since then, cases have from time to time been reported by other observers, making in all a total of 53 cases. A complete bibliography is given in the paper by Corner and Pinches. The condition is sub-divided into three classes as follows :—

1. *Hernial.*—In this class there is always a Hernia of some kind present and the torsion of the omentum is within the hernial sac. There are 6 such cases recorded.

2. *Abdominal.*—No hernia is present in these cases and the twisted omentum is within the abdominal cavity. There are also 6 cases of this class reported.

3. *Hernial and Abdominal.*—A hernia is present in this variety, but the twisted omentum is not limited to the hernial sac; it also extends into the abdominal cavity. Of this type, 41 cases are collected.

Etiology.

Sex.—Of the 53 cases recorded, 36 were in males and 17 in females.

Age.—It is mostly a condition met with in middle life, 33 cases having been met with between the ages of thirty-five and fifty-five. The youngest recorded example was at 17 years and the oldest at seventy-nine years.

A *Hernia* was present in 47 cases, of which 45 were inguinal, 1 ventral, and 1 umbilical. No case with a femoral hernia has been reported. With three exceptions the hernia was previously reducible and it is generally of long standing; 10 cases were between twenty and thirty years, 21 were between ten and twenty years, and 16 under ten years.

Previous History.—In 16 cases only is there a reference to a previous illness which possibly was connected with the twisted omentum. In these instances there were previous attacks of pain referred either to the hernia or the abdomen. These

attacks may have been due to colic, appendicitis, or some other condition not connected with the twisted omentum, but probably they were due to increments of the torsion, especially when it is remembered that as many as ten complete twists have been found in some cases.

Symptoms.

The *Onset* is often sudden and generally in the form of sharp pains. Of the 6 abdominal cases, in 4 the onset was exceedingly sudden.

Pain is the most constant and striking symptom associated with torsion of the omentum and is usually the first to appear. The position to which the pain is referred depends on the type of case. In the hernial type, in 4 cases it was referred exclusively to the hernia. In the abdominal type, pain was noted in the abdomen in all cases and mostly referred to the right iliac fossa. The following table shows the site to which the pain was referred in cases belonging to the hernial and abdominal class :—

Pain in hernia alone	14 cases.
„ „ abdomen alone	17 cases.
„ „ both positions	7 cases.
„ not mentioned in any particular region .	3 cases.

Generally the pain is very acute and persistent, though in Morrison's case there were periods in which the patient was absolutely free from pain. It is usually so severe as to cause the patient to take to bed.

Vomiting is not a very constant symptom. In 19 cases it is said to have been present; in 14 cases it is noted that there was no vomiting, and in 20 cases no mention of vomiting is made.

The *Condition of the Bowels* varies. In 2 cases there was diarrhœa; the bowels are said to have been "open" in 16 cases; in 11 cases they were inactive; and in 5 cases flatus alone was passed. Absolute obstruction was noted in 5 cases.

The *Pulse* as a rule is quickened, varying from 80 to 120 per minute.

The *Temperature* is usually raised to 100° or 101°.

Physical Signs.

A *Tumour* could be felt in all but 3 cases, though its situation varied. In the hernial type a hard, painful, and irreducible swelling was felt in the sac. In the abdominal type a mass was observed in the right iliac region in 4 cases; in the other 2 cases there was tenderness and rigidity in that region, but no tumour could be felt. In the hernial and abdominal type a

tumour was found in the hernial sac alone in 12 cases; an abdominal tumour alone was found in 7 cases; and tumours were found in both sites in 19 cases. No tumour was detected in 3 cases. When tumours are present in both situations it is frequently noted that they appear to be continuous. The tumour is usually hard and tender on palpation, dull to light percussion, and often has an irregular surface. General distension of the abdomen is not common; it was noted in only 7 cases.

Diagnosis.

The following diagnoses have been made in the 53 recorded cases.

1. *Hernial.*—Strangulated hernia, 4 cases; irreducible hernia, 1 case; and incarcerated hernia, 1 case.

2. *Abdominal.*—Appendicitis, 5 cases; suppurative omental hydatid, 1 case.

3. *Hernial and Abdominal.*

Strangulated inguinal hernia	14 cases.
Incarcerated „ „	1 case.
Irreducible „ „	2 cases.
"Inguinal hernia" ? condition	2 „
Strangulated umbilical hernia	1 case.
Reduction of hernia *en masse*	2 cases.
Sarcoma of testicle	1 case.
Appendicitis	9 cases.
Intestinal obstruction	1 case.
Abdominal tumour	1 „
Intra-peritoneal abscess	1 „
Chronic peritonitis	1 „
Torsion of the omentum	1 „
No diagnosis	4 cases.

The conditions which should lead to a suspicion of the existence of torsion of the omentum are as follows. The patient is most commonly a man of middle age with an inguinal hernia of some years' standing. The hernia may have been troublesome, and from time to time given rise to symptoms similar to those of sub-acute obstruction. Vomiting may be absent, and both fæces and flatus may be passed. On examination the hernia will most probably be painful and irreducible, incarcerated or strangulated. Usually a tumour can be felt, which may be in the hernial sac or the abdomen, or both.

In the *Hernial* type, the diagnosis cannot be made with much certainty, and is often a conjecture. It is difficult to say that the omentum alone is in the sac. The impulse given to an

omental hernia on coughing is less definite than that communicated to one containing bowel.

In the *Abdominal* type, 5 of the cases recorded were diagnosed as appendicitis, and 1 as a suppurating omental hydatid. If the tumour be observed before the pain is marked, and especially if there has been no vomiting, the probability is that the condition is not due to appendicitis. The site of the tumour may enable the observer to exclude appendicitis. The condition may, however, be only recognised at the operation.

In the *Hernial and Abdominal* type, the presence of a tumour in the hernial sac continuous with one in the abdomen allows of a diagnosis being made with some degree of certainty. Symptoms of a sub-acute abdominal condition will accompany these local signs. In the cases reported the majority of the diagnoses made concerned the hernial condition and was generally that of strangulated hernia; when the abdominal signs predominated, the condition was usually diagnosed as appendicitis. Rectal examinations have never revealed anything in these cases, but may be useful in excluding pelvic cellulitis.

In women the Fallopian tubes and ovaries are sometimes found in a hernia, and may give rise to a condition similar to that described above. In some cases a hernial sac has been emptied without relieving the symptoms, evidently owing to the fact that the torsion of the omentum has not been relieved. In two cases (Peck's and Noble's) the symptoms showed themselves while the hernial sac was empty. In these cases there is no certain guide that the condition is not due to appendicitis.

Prognosis.

Out of the 53 cases, 45 recovered and 8 were fatal. Of the fatal cases, one was too far gone for anything to be done, and one was operated on as a last hope; two cases died from pneumonia, and one from delirium tremens. The cause of death is not given in Zeller's case, and one died presumably from peritonitis. The prognosis of torsion of the omentum is therefore good, especially when the cases in which fatal results not due to surgical intervention are excluded.

Nothing need be said in regard to *Treatment*, except to point out that the affected omentum should be excised after its pedicle has been ligatured. It may be necessary to open both the hernial sac and the abdominal cavity.

OBSTETRICS

By ROBERT JARDINE, M.D.,
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OBSTETRIC INJURIES TO THE CORNEA

IN the *Ophthalmoscope* for June, Drs Ernest Thomson and Leslie Buchanan have a most interesting paper on this subject. In the *Transactions of the Ophthalmological Society* for 1902, Dr Thomson's first paper on this subject appeared. In it he recorded three cases of peculiar corneal injuries during delivery, under the title of "Traumatic Keratitis of the Newborn." This was the first occasion on which such injuries were described in detail. In the 1903 volume of the same *Transactions*, a more elaborate paper was published by him, in conjunction with Dr Buchanan. In the first two papers six cases were dealt with, and in the present one, nine more, making fifteen in all. Even in difficult assisted labours, corneal lesions are extremely rare, yet they may occur in unassisted labours, as in one of their cases, where the arm, head, and cord presented, and delivery was effected by natural efforts. The lesion is undoubtedly caused by pressure of a blade of the forceps or of the promontory of the sacrum. In at least three of the cases, in addition to the corneal lesion, there was a marked cranial depression. In one case, in which there was a cranial depression, the lesion was bi-lateral. The eye, on the depressed side, was extruded from the orbit.

In their 1903 paper, the authors distinguish clinically three varieties of changes in the cornea, viz.—

(*a*) "A diffuse opacity, which is temporary."

(*b*) "A diffuse opacity, indeterminate in position, which is permanent."

(*c*) "An opacity which takes a linear form, and is permanent."

Further observation has convinced them that (*b*) is temporary, and so they now classify the lesions under two headings only, viz.—

(1) "A diffuse opacity, which is temporary."

(2) "A permanent opacity, which takes a linear form, and passes vertically, obliquely, or horizontally across the whole, or a part of the cornea, in a straight or curved manner, or concentrically with the limbus. In most cases there is more than one linear opacity."

The first form is due to œdema, and it may occur alone, or in conjunction with the second. The second is due to the rupture of the posterior elastic lamina of the cornea and sub-

sequent scar formation. For two or three weeks after delivery, it is, as a rule, associated with general opacity, which at first masks the appearance due to rupture of the elastic lamina.

The authors assert that the clinical appearances tally with the pathological findings, but so far they are unable to state the exact cause of the pressure, its direction and amount. In the first cases observed, the linear opacities were more or less vertical, but in one of the later cases they were exactly horizontal. In some, again, they have been obliquely placed.

The clinical course of these cases is very uniform. First, there is a general haze, with indication of striping; then an increase of general opacity, sometimes to an absolutely impenetrable degree, and often obscuring the striping; and, finally, gradual diminution of the former, which is due to œdema, and increased visibility of the latter, which, again, is due to scar tissue.

Regarding prognosis, increasing evidence goes to show that the persistence of these corneal scars, or at any rate of their effect on vision, is very considerable. The permanence of the visible scars, and also their effect upon vision, have yet to be determined. In course of time the opacities become indistinct, but it must be remembered that even when almost invisible they may still give rise to much distortion of the corneal curvature, and to consequent astigmatism.

We give in detail two of the cases:—

Case 1.—"*Obstetric History.*—Nineteen-year-old primipara, true conjugate, 3½ inches. First and second stages, 24 hours. Child, female, 7¾ lbs., could not be got to breathe. Very difficult forceps delivery, vertex presentation. One blade of forceps applied over outer angle of right orbit."

"*Ophthalmic account.*—Right Eye. Anterior chamber full of blood. Cornea very cloudy, and showing vertical bands. On horizontal antero-posterior section of eyeball, after washing out the blood from the anterior chamber, there remains a layer of blood on the posterior surface of the cornea, interrupted by four clear bands close together, running approximately vertically across the cornea. These clear bands are due to the absence of the layer of blood. The widest band measures 1 mm. at its middle, and tapers above and below; the outer bands are from one-half to one-quarter this width. Microscopically, the four clear bands correspond with gaps due to ruptures of the posterior elastic lamina. The principal rupture, in sections at right angles to its course, shows that the severed ends of the lamina are widely separated, and that, approximately, five layers of the cornea are also ruptured. The torn ends of the lamina are turned forwards, and adhere to the corneal structure. The floor of the concavity formed by the retraction of the ruptured corneal

lamellæ is smooth, because the ruptured fibres are sealed down by fibrin. There is very little disturbance of neighbouring corneal tissue. The second largest rupture shows destruction of only one corneal layer, and inversion of the ends of the posterior-elastic lamina. The other two ruptures involve the lamina only." A plate is given showing the condition.

Case 2.—"*Obstetric History.*—Mrs M. Primipara, C.V., 2¾ inches. First and second stages, 23 hours. Female full-time child, 5¼ lbs. Vertex presentation. Difficult forceps delivery. Head very much moulded, no cranial depression. Marks of forceps blade on each frontal bone."

"*Ophthalmic account.*—Opacity of right cornea was noticed immediately after birth. The case was seen by one of us on the next day, and the following account of its progress is instructive, showing, as it does, the alterations which take place in the appearances of the cornea when observed over a long period. On the day after birth (December 28th, 1903) the right cornea presented a well-marked general opacity, on magnification seen to be made up of closely packed dots, through which the pupil was visible. In addition, there was an appearance as if horizontally through the centre of the cornea there was a clearer area bounded by two narrow sharp lines; above and below these the opacity seemed uniform. On the 29th the general opacity was more marked, the striped appearance less marked. By January 1st, 1904, the general opacity had become so great as almost to obscure the pupil even with focal illumination, and the striped appearance was entirely masked: corneal surface like ground glass.

"On January 4th the general opacity was becoming less and the striping more manifest again. From this date onward the general opacity gradually cleared, leaving two horizontal bands. On November 12th, 1904, 10½ months after birth, the now strictly linear opacities persisted right across the cornea, and, though hardly visible against the light iris background, became clearly defined on dilating the pupil.

"It is worthy of note in this case that the house surgeon was perfectly certain that both blades of the forceps were over the face."

OPHTHALMOLOGY

By J. V. PATERSON, M.A., F.R.C.S.,

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THE PATHOGENESIS OF SENILE CATARACT

DR RÖMER, Würzburg, in *Von Graefe's Archiv. für Ophthalmologie*, lx. 2, treats of this well-worn subject from an original

standpoint. Dr Römer has determined that ophthalmology shall not lag behind other branches of medicine in availing itself of the discoveries made in regard to immunity and the nature and mode of action of toxines. To him we owe the introduction of the serum treatment of the pneumococcic ulcer of the cornea, and together with Wessely, he has investigated the hæmolytic action of the aqueous humour in normal and abnormal conditions. Dissatisfied with the various theories which have been brought forward to explain the occurrence of senile cataract, he is convinced that we must investigate along new lines. An enthusiastic disciple of Ehrlich, he seeks in the present article to show what new fields of enquiry in eye pathology are opened up by the study of the action of serums on the intra-ocular tissues, and especially the lens. Surgical interference ought not, he considers, to be looked on as the final aim of our knowledge in relation to the treatment of senile cataract. We ought not to despair of some day attaining to a method of successful prophylactic treatment, and such a desirable end can only be reached by the serum method of investigation and experiment.

In the first part of his paper Dr Römer shortly sketches and criticises certain of the best known theories adduced to explain the occurrence of cataract. Deutschmann's theory of a sclerosis of the lens does not carry us far, and an attempt like that of Schön to make cataract due to dragging on the zonule of Zinn is easily controverted by an appeal to clinical facts. Peters' view that cataract is due to a modification of the ciliary secretion depending on morbid changes in the ciliary epithelium seems a distinct advance on previous theories. By testing the electric conductivity of the aqueous, Peters found that in certain conditions the saline ingredients are increased. This increase reverses the osmotic conditions existing between the lens and the aqueous, and the condition of the lens suffers. Peters thus ascribes cataract rather to local changes in the ciliary body than to any general pathological condition. Against Peters' view in its entirety much may be said. Greeff's experiments have shown that after puncture of the aqueous the very conditions exist which, according to Peters, are liable to produce cataract, viz. changes in the ciliary epithelium, and in the constituents of the aqueous. Yet puncture of the aqueous, frequently repeated, does not appear to have any tendency to produce cataract. Nor has it been found that artificially increasing the saline constituents of the blood causes cataract. The changes in the salinity of the aqueous which Peters observed amounted only to 0.03 or 0.05 per cent. Römer cannot believe that such a minimal increase

could produce a change in healthy lens cells so as to cause cataract. He believes that the earliest gross change in the formation of cataract is swelling of the lens, this swelling being due to some injury to the lens cells, so that they are no longer able to resist the penetration of water from the aqueous. That cataract has some relation to changes in the organism as a whole is a view that has always met with much support, but attempts to connect the formation of cataract with such definite morbid conditions as albuminuria, atheroma, etc., have not brought conviction to many. Professor Hess, in his monograph on the pathology of the lens (*Graefe-Saemisch Handbuch*), warns us against taking a too purely physical view of osmotic processes, etc., going on between the lens and the fluids which surround it. He lays stress on the fact that the cells of the lens must be considered as living elements, the changes in which are not entirely controlled by physical conditions.

Bearing this view in mind, Römer brings forward his hypothesis that senile cataract is due to the action of cyto toxines on the protoplasm of the lens cells. The retrogressive metamorphoses of senile decay give occasion, he thinks, for the formation of auto cyto toxines. In normal states, cyto toxines do not find their way into the fluids of the eye, as they are kept back by the secretory apparatus. Further, these cyto toxines cannot act unless they meet suitable receptors in the protoplasm of the lens cells. The injury to the lens cell by the toxine is the primary lesion in cataract formation. Changes due to altered osmotic conditions may follow. Having thus far explained his point of view, Römer goes on to show how experiment proves that cyto-toxines do not, under normal conditions, pass into the intra-ocular fluids, being kept back by the secreting cells of the ciliary body. A hundred experiments were done to show that the hæmolysines of the blood serum under normal conditions of the eye never passed into the aqueous or vitreous. Agglutinins, however, were sometimes found in these fluids. Römer then asks the further question—Would the cytotoxic retention by the ciliary body hold good, not only for the normal hæmolysines of the blood, but also for such substances (cytotoxines) as we may suppose to arise in the pathological constitutional conditions causing cataract? This question he answers from the findings of a passive immunisation experiment. Using a cholera immune serum from the goat, he injected intravenously into 3 rabbits, 5000 units, then drew off the aqueous in 1, 2, or 3 hours. This aqueous was carefully mixed with a lethal dose of a virulent cholera culture and injected into the peritoneal cavity of a guinea-pig. The animal died as quickly as the control animal.

A similar experiment was made with the vitreous, with a like negative result. Römer therefore concludes that so long as no inflammatory or irritative condition is present in the eye, the bactericidal amboceptors do not escape into the intra-ocular fluids. This conclusion gives Römer opportunity to point out the possible limitations of serum therapeutics in cases of infection of the aqueous and vitreous, and to explain why infection of the vitreous is so much more serious and difficult to combat. While in inflammatory conditions of the anterior part of the eye, *e.g.* cornea or iris, the "anti-bodies" readily find their way into the aqueous, they do not to any extent reach the vitreous unless at a stage when it is too late to save the eye. Even in the case of an actively immunised animal, Römer found that though the aqueous showed potent bactericidal properties, the vitreous showed little or none. Römer thinks the law of cytotoxine retention by the ciliary body is on the whole salutary, though it renders the eye less capable of combating infective processes than would be the case were the "anti-bodies" freely poured out into the intra-ocular fluids. The object of their retention is, no doubt, to prevent their injuriously affecting the lens. Further safeguards for the lens are found in the rapid elimination of toxines from the anterior chamber, and in the very slow processes of diffusion by which toxic substances reach it. Passing changes in the constitution of the aqueous have no time to act on the lens. Only when the vessels of the secreting organ have suffered and the lens is exposed for long periods to the action of specific cytotoxines is it apt to suffer injury involving loss of transparency. In a second part of his paper, Römer sets himself the task of proving that the lens cells are accessible to the working of "anti-bodies." He has to prove that receptors capable of binding "anti-bodies" exist in the lens. This problem is naturally closely associated with the question of the nutrition of the lens, for immunity is after all only a small part of the general physiology of cell nutrition. Leber has maintained that the lens requires no nourishment for the performance of its function, but only for purposes of cell growth. Römer again recurs to his argument that the lens cells must be considered as containing living protoplasm and constantly in need of nutriment, although doubtless their needs in this respect may be considered as very small. A peculiarity of the lens is that though bathed in fluids not isotonic with itself, it yet keeps the amount of water which it contains at a constant level, and at the same time is able to prevent loss of its albumen into the fluid media round it. To return to the problem of whether the lens protoplasm is liable to be acted on by "anti-bodies," Römer shows that specific

agglutinins for the blood cells of the rabbit exist in the lens. Experiments were made with blood from 11 different species of mammals, and with lenses from 10 different species. Rabbit's blood was agglutinated by the lenses of all the different species, but only rabbit's blood gave the reaction, blood from the other species giving altogether negative results. In the lens of the rabbit, agglutinins were found capable of clumping the blood cells of the same animal. In man the entire lens, but especially the soft cortex, showed agglutinative powers for rabbit's blood. An interesting point was that the agglutination in all cases disappeared at a temperature of 37° C.

Römer further experimented to show that the lens possesses bodies capable of neutralising toxines. The toxine with which he succeeded in showing this was one of the tetanus poisons, tetano lysin. The other components of the tetanus poison, *e.g.* tetano spasmin, were not assimilated and neutralised in the same way by the lens. In a concluding series of complicated experiments, Römer shows that the lens protoplasm has great affinities for the complement present in the blood-serum, and especially for the complement of human blood-serum. His experiments, he maintains, enable us to imagine how readily the lens will yield itself to the action of toxic agents. He is still busy experimenting, and promises in a short time to bring forward results which will carry us still further in our knowledge of how changes in the lens are brought about.

[This article is too detailed and the number of experiments described far too great to admit of adequate treatment in a short abstract. The keen originality of the author, his experimental genius and enthusiasm, make his work of absorbing interest, and should do much to encourage work on similar lines in other branches of ocular pathology.]

New Books and New Editions

Addresses and Other Papers. By W. W. KEEN, M.D., F.R.C.S.Ed. Hon. 8vo, pp. 441, illustrated. Philadelphia and London: W. B. Saunders & Co. 1905. Cloth, 17s. 6d. net.

THE name of the distinguished Professor of Surgery in the Jefferson Medical College of Philadelphia has long been well known in Europe as in America. Dr Keen was one of those selected by the Royal College of Surgeons of Edinburgh to receive the Honorary Fellowship of the College—the highest honour in their gift—on the occasion of their quater-centenary celebration.

In his public utterances Dr Keen showed that he possessed the rare gift of eloquent, well-ordered speech, sweetened by tact and courtesy, and spiced by humour. Pawky as a Scotsman, quaint and sudden as an American, he kept us all hanging on his lips.

This book is crammed with wit and wisdom. The addresses are on a variety of topics, historical, ethical, prophetic, and eulogistic, but all bearing on medical education and progress in various departments. They are not all equal in value. Some have a local and temporary interest, and the earlier ones have not been brought up to date; but in every page the master's hand can be recognised. Thoughtful, calm, well-arranged, they are the work of a born *teacher*, as well as of a successful practical surgeon—an all-round man, not a specialist, cultured, travelled, a classical scholar, and a devout Christian. No one can read these essays without being a better man, and above all he must feel that Dr Keen would be a good man to have for a friend, while it would only be a bad man or a bad cause that could find in him an enemy.

It is a book from which pages of quotations could be "lifted," to use an old Border phrase. One sentence only we must quote conveying a wise hint to the professor of the future, and his electors:—

"A man who is engrossed in a very large private practice often finds it difficult to give that amount of time which the newer education and the newer methods of instruction of classes in small sections require; and I believe that in the future the professors in our medical schools will be more and more restricted in their practice until, eventually, they will practise in the hospital, give their lectures, and do little or no outside practice. This will require, of course, very much larger salaries than now can be given, where the income of the school is derived from fees; and, in order to do this, it is requisite to have large endowments of the medical schools" (p. 197).

The Practice of Medicine: A Text-Book for Practitioners and Students, with Special Reference to Diagnosis and Treatment. By JAMES TYSON, M.D., Professor of Medicine in the University of Pennsylvania, and Physician to the Hospital of the University, Physician to the Pennsylvania Hospital, etc. Third edition, thoroughly revised, and in parts rewritten. Pp. 1240. London: Rebman, Limited. 1905. Price 24s.

THIS is an excellent general text-book on Medicine, and compares most favourably with those already in the field.

It is divided into thirteen sections, of which the first is devoted to Infectious Diseases. This section, one of the best,

extends to over 300 pages. Under this heading, Tuberculosis, in all its forms and phases, is fully and carefully treated.

There are four excellent coloured plates of Koplik's spots, taken from the *Medical News*.

In Section 2, Diseases of the Digestive System, the article on Diagnostic Technique is well worth perusal and remembering.

All the modern operations in connection with diseases of this section are mentioned, but not unduly urged.

The Diseases of the Respiratory System are described under Section 3, to which there are 150 pages given. The diagrams here are many and well selected.

Section 4 contains an account of the Diseases of the Heart and Blood-Vessels. Both of the above seem to us carefully, although somewhat compressly written.

In Section 5, on the Diseases of the Blood and Blood-making Organs, there are three good coloured plates in connection with Pernicious Anæmia and Leukæmia. Then follows Diseases of the Thyroid Gland, Diseases of the Urinary Organs, and Constitutional Diseases, under Sections 6, 7, and 8, all representing concisely our present knowledge of these diseases.

Section 9, on Diseases of the Nervous System, is the fullest and best in the book. It begins with two articles, on the Histology of the Nervous System, and on General Symptomatology, both of which are well illustrated. The ordinary diseases then follow. The section closes with an article on Syphilis of the Nervous System.

Then follows Section 11, on the Intoxications; Section 12, on the Effects of Exposure to High, though Bearable Temperature; and Section 13, on Animal Parasites and the Conditions caused by them.

Lastly, in Section 14, there is Summary of Symptoms following Overdoses of Poisons and the Treatment of their Effects. To which is added a Table of Minimum Dose which has caused Death and Maximum Dose followed by Recovery.

The Diseases of the Skin are not specially treated.

The book is a handy volume, and the print is large and paper fair. There is a good index, which naturally enhances the value of the book.

The historical account given of Typhoid Fever and that on Appendicitis is interesting.

It is always difficult to compare text-books on Medicine, especially when there are a good many to choose from. This one of Dr James Tyson's, however, is correctly, concisely, and practically written; a book which has already obtained a wide circulation, and this last and third edition will tend to increase its sale and popularity.

A Contribution to the Pathology of the Endometrium. By JESSIE M. MACGREGOR, M.D., L.R.C.P. & S. Pp. 52. Edinburgh: William Green and Son.

THE author is heartily to be congratulated on the production of this monograph, which gives the results of the careful investigation of the large number of uterine scrapings sent to the laboratory of the Royal Colleges, Edinburgh, for report.

The subject is one which, considering how common the condition is, has had till now scant attention paid to it from a scientific aspect by British workers.

As the author shows, its unfortunate designation ending with the syllable "itis," conveys the impression of inflammatory origin which, in the majority of cases, is conspicuous by its absence. We regret, however, that no simple suitable term has been suggested in its place.

The chapters on the Normal Endometrium and the Changes during Menstruation are very instructive; particularly so is the description of the blood-vessels which play such an important rôle in the functions of the organ.

The various gradations of the development of malignancy, through the stages of adenoma malignum and adeno-carcinoma to pure carcinoma are also worthy of close attention.

From the want of any history of many of the cases from which the specimens were derived, the clinical deductions are but scanty, and the treatise is more of a pathological nature. As such, however, it must rank as the most complete on this important subject in the English language, and all her Edinburgh colleagues will regret the possibility that the author's future works may be written in American.

A feature of the work is the excellent series of micro-photographs which add inestimably to its value.

Clinical and Pathological Observations on Acute Abdominal Diseases due to Conditions of the Alimentary Tract, and the Uniformity of their Origin. The Erasmus Wilson Lectures, 1904. By EDRED M. CORNER, B.Sc. (Lond.), M.A., M.B., B.C. (Cantab.), F.R.C.S. (Eng.); Surgeon to Out-Patients; Surgeon to Physical Exercise Department, St Thomas' Hospital; Assistant-Surgeon to the Hospital for Sick Children, Great Ormond Street; Erasmus Wilson Lecturer to the Royal College of Surgeons. London: Archibald Constable & Co., Ltd. 1904.

THE contents of this little volume formed, under a slightly different title, the subject of the Erasmus Wilson Lectures for

1904. Its main object is to draw attention to the similarity of the pathological changes that occur in all acute intestinal conditions, and to prove that the pathology of acute surgical diseases of the alimentary tract is governed by laws similar to those which exist in suppuration and abscess formation in other parts of the body It consists of twenty-eight sections, one and all full of original and critical observations. One of especial interest is that dealing with the production of a fæcal fistula after suppurative appendicitis. The author brings evidence to show that the fistula is usually situated in the small intestine, and results from a spread of the infective process from the appendix to a coil of adjacent ileum. The importance of the mesenterial anastomosis in the prevention of gangrene from obstruction or injury to one of the mesenteric vessels is emphasised, and many interesting cases are cited to show the important part that bacteria play in the production of local death or necrosis. One of the pyogenic cocci probably starts the process, which is ultimately completed by the bacillus coli communis.

It is an able and suggestive piece of work, and cannot fail to be read with interest.

A Manual of Midwifery for Students and Practitioners. By HENRY JELLETT, B.A., M.D. (Dub. Univ.), F.R.C.P.I., L.M., Gynæcologist and Obstetric Physician to Dr Steevens' Hospital, Dublin, etc. With the assistance in special subjects of W. R. DAWSON, M.D.; H. C. DRURY, M.D.; T. G. MOORHEAD, M.D.; and R. J. ROWLETTE, M.D. Pp. xxvi. + 1158, with 9 plates and 467 illustrations. London: Baillière, Tindall & Cox. 1905. Price 21s. net.

THIS work might fitly be termed a "Dublin System of Obstetrics." It is written by an ex-assistant master of the Rotunda, with the collaboration of various physicians and pathologists of Dublin. It is dedicated to the past Masters (alive and dead) of the Rotunda Hospital, "to whose skill and learning the Dublin School of Midwifery owes its great prestige"; and its teaching throughout follows the lines which Irish obstetricians love to term the "Dublin methods." This method of writing a text-book has its advantages: it enlists the sympathies of the sympathetic Irish student, it confers a breezy interest to the discussion of methods of treatment in which the "Dublin School" thinks that it excels all other schools, and it enables the writer to state definitely the plan of procedure which he recommends without confusing issues with the con-

sideration of other plans. But it has also its disadvantages, the greatest and gravest of which is the danger that valuable obstetric methods and plans of procedure in use in other medical centres may be passed over in silence, or dealt with somewhat harshly, in order to throw into clearer relief the excellencies of the methods and plans which are practised by the writer and his teachers and pupils. We do not suppose that even Dr Jellett claims that the "Dublin methods" are always right, or that obstetrics has yet reached a stage beyond which further improvements are impossible.

If, however, we leave out of account this feature in the work under review, we have much to say in praise of the material, the illustrations, and the get-up of the book which Dr Jellett has produced. The chapters on Obstetric Anatomy are clear and full, save that the recent views of Fränkel on the corpus luteum are left unconsidered; the part dealing with Embryology leaves the reader in the belief that the amnion in the human subject is formed as it is in the chick, but more recent views on the formation of the placenta and deciduæ are stated, and the diagram of Grafspee (*sic*) is reproduced. The umbilical cord is said to be covered by amnion. The skull of the fœtus is well described. A distinction is drawn between "lie" and "presentation," and the term "position" is defined as "the relation between some fixed part of the fœtus and the middle line of the mother." There is a good chapter on Obstetrical Asepsis with reflections on the changes wrought by the introduction of antisepsis into the "great Rotunda Hospital"; and the contents of the midwifery bag are enumerated, but nothing is said about the bag itself, or whether it ought to be a bag. Obstetrical diagnosis is fully described, and the author admits that the vaginal touch cannot be entirely dispensed with, although he would limit its use very much. The diagram of the measurement of the external conjugate by a pelvimeter on page 191 will scarcely help the student to perform this little manœuvre, for it makes it appear as if the patient were lying on her back. The term "oblique conjugate" is used instead of the more familiar "diagonal conjugate." The chapters on the Physiology and Pathology of Pregnancy are good; and it may be noted in passing that the author supports the narcotic method of treating convulsions. It is in the chapters on the Physiology and Pathology of Labour that the teaching of the "Dublin School" appears to differ most from, say, that in use in the Scottish Universities. For instance, Schultze's theory of separation of the placenta appears to Dr Jellett as "the most obvious and the most natural"; the views on the cause of internal rotation are different; a Murphy's chloroform inhaler is recommended in labour; and the

management of the hæmorrhages has some features peculiar to Dublin practice. The ascription to Neville and Milne Murray of the introduction into British practice of the axis-traction principle in the use of forceps is inaccurate ; and the late Dr Milne Murray would himself have insisted upon this, for he was a student in the midwifery class in Edinburgh the year (1880) when Professor A. R. Simpson read his paper on the axis-traction principle, and showed it as applied to the Simpson forceps (*Trans. Edin. Obstet. Soc.*, v. part iii. p. 219, 1880). Dr Milne Murray's paper on the same subject appeared in 1891. Curiously enough the management of retention of urine in the puerperium does not appear to be considered anywhere.

Although we have criticised several points in Dr Jellett's work, we have done so not because we were blind to the many excellences of the book, but because there exist several differences in obstetric theory and practice between the Irish and the Scottish schools, and these come prominently forward in the Manual. At the same time the book, although larger than most students will care for, may safely be predicted to be widely read among practitioners of many schools, who may say, like Mercutio, "a plague o' both your houses." After all, there is a safe middle path betwixt conflicting theories which the medical man can conveniently follow.

Practice of Midwifery for Nurses. By HENRY JELLETT, B.A., M.D., B.Ch., B.A.O. (Dublin University), F.R.C.P.I., L.M., Gynæcologist and Obstetric Physician to Dr Stevens' Hospital, Dublin. Ex-Assistant Master, Rotunda Hospital, etc. Second Edition, Revised. With 5 coloured plates and 133 illustrations in the text, also an Appendix and a Glossary of Medical Terms. London: J. & A. Churchill, 7 Great Marlborough Street. 1905.

THIS second edition of "A Short Practice of Midwifery for Nurses" is a distinct improvement on the first. Many useful illustrations and plates have been added, and also a glossary of medical terms. Embodying as it does the treatment adopted in the Rotunda Hospital, the book will be of special interest to nurses trained in that Institution, but also to nurses trained elsewhere we would recommend it as a most useful guide.

Dispensing Made Easy. By W. G. SUTHERLAND, M.B. Second Edition. Bristol: John Wright & Co. Price 3s. 6d.

THIS is a book which commends itself specially to the general practitioner who dispenses his own medicines.

It is full of practical hints and time-saving devices. Attention to its suggestions will do much to mitigate the drudgery of dispensing, and at the same time will make for efficiency and economy.

Dietetics for Nurses. By JULIUS FRIEDENWALD, M.D., and JOHN RUHRÄH, M.D. Pp. 363. Philadelphia and London: W. B. Saunders & Co. 1905. Price 6s. 6d. net.

ALTHOUGH the title indicates that the book is intended for nurses, the preface states that it is also intended for laymen who are interested in feeding the sick. The elementary chapters on the chemistry and physiology of diet, on the classes of food and their bearing on diet, are well adapted to the purposes for which the book was written. The chapters on the feeding of infants and children are specially to be commended.

It seems a mistake to devote so much space in the succeeding chapters (covering 130 pages) to the discussion of diet in disease from the physician's rather than from the nursing point of view. The ordering of the diet must be with the medical attendant. It is doubtful whether these chapters will be of much use to laymen. Some of the principles laid down are open to serious criticism, for example, the giving of food every two hours in dilatation of the stomach. The food value of each ingredient in most of the diet tables is expressed in calories; it is therefore possible to note at a glance how any modification may affect the food value.

The recipes are not those of the ordinary cookery book. They afford considerable variety, and should be of great use to nurses. The quantities and instructions are precise, except that in a few recipes such an indefinite quantity as a cupful is given.

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From W. GREEN & SONS.—*Chapters in Pathology*, by W. S. Greenfield, price 5s. *Methods of Morbid Histology and Clinical Pathology*, by T. Walker Hall and G. Herxheimer. *A Contribution to the Pathology of the Endometrium*, by Jessie M. Macgregor. *Essentials of Human Physiology*, by D. Noël Paton, 2nd edition.

From W. B. SAUNDERS.—*Reference Hand-book for Nurses*, by Amanda K. Beck. *Text-book of Medical Chemistry and Toxicology*, by R. C. Holland. *Addresses and Other Papers*, by W. W. Keen, price 17s. 6d. *Dietetics for Nurses*, by Julius Friedenwald, price 6s. 6d. *A Text-book of Topographic and Applied Anatomy*, by Prof. Dr O. Schultze of Wurzburg, edited with additions by G. D. Stewart, price 25s. *Malarial Diseases, Influenza and Dengue*, by S. Mannaberg, of Vienna, and Dr O. Leichtenstern, of Cologne, edited with additions by Ronald Ross, price 21s. *Atlas and Epitome of Operative Ophthalmology*,

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From J. MACLEHOSE.—*A Plea for the More General Use of Tuberculin by the Profession*, by Dr M'Call Anderson.

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From SCIENTIFIC PRESS.—*Hand-book of Intestinal Surgery*, by L. A. Bidwell, price 6s.

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THE SCOTTISH
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OBSTETRIC VIEWS THAT NEED REVIEWING

By WILLIAM STEPHENSON, M.D., F.R.C.S.,
Professor of Midwifery, University, Aberdeen

(*Continued from p.* 300)

IV.—Concerning the Management of the First Stage.

PRINCIPLES AND PRECEPTS.

An eminent obstetrician of last century, Dr Hodge of Philadelphia, taught that "*The practitioner should ascertain accurately the progress of the labour, and be ready to obviate any irregularity that may occur, or to facilitate any of the natural changes which should successively ensue.*"

These words embody a high ideal of practice, higher than the ordinary level of current opinion or custom. Their spirit can animate us from the beginning; the ideal can be reached only by cultivating the power of observation, and the habit of ruminating over our cases. Some men smile in unbelief when it is said one can learn from every case of labour attended.

In the above quotation we see figured, not the coast-guardsman ready to succour a vessel in distress, but the skilled and watchful pilot, who will safely steer the ship into harbour. In the present day anxiety to avoid the many-headed Scylla of *Sepsis*—there is a risk of drifting into the whirlpool of Charybdis—*laissez-faire*. Careful guarding and assistance are deemed necessary towards the end of labour; but in the first stage, difficulties and risks are unheeded, because Nature ultimately overcomes most of them—but at what cost? Many a

woman has suffered grievously because some defect in the mechanism of her labour has heedlessly been unnoticed, or it may be from the old-time reverence for the bag of waters. *Ineffectual* action is as injurious in the first stage as in the second; inertia in the third stage not infrequently has its origin in a protracted first.

In this country, Professor Hamilton of Edinburgh, and Professor Burns of Glasgow University (1774-1850), of old advocated strongly the principle of opportune aid. Owing, however, to erroneous ideas as to mechanism, and the fear of abuse by the ignorant or impatient, the methods they recommended—as old as Smellie's time—have since received little published support. Experienced practitioners, however, find them out for themselves, and practise them. Why should teaching be lowered to the level of the rude or uncultured, instead of directing the way that, under given conditions, may be cautiously followed as experience is acquired?

Though lengthy, the following remarks by Dr Burns are worth quoting; they express the *motif* of this paper, and are food for thought. He wrote: "Great forbearance, care, and judgment are required on the part of the practitioner, who should steadily do his duty, being neither swayed by his patient's fears and entreaties nor by a selfish regard to the saving of his own time." "Some women seem constitutionally to have a lingering labour, being always slow. In such cases, unless the process be considerably protracted, or attended with circumstances requiring our interference, it is neither useful nor proper to do more than encourage the patient and preserve her strength." "Let not the principle (of aiding labour) suffer from its abuse, else, where is the plan which could stand its ground? It is perfectly clear that when the process is going on well, interference is improper; but it is no less evident that if a long time is to be spent in accomplishing the first stage of labour, or dilatation of the os uteri, the vigour of the uterus and strength of the patient may be impaired so much as to render the subsequent stage dangerously tedious, or to prevent its completion, at least with safety." . . . "If we wish to avoid this exhaustion, which may be followed by pernicious effects, we have only the choice of either suspending the action altogether for a time, or of endeavouring to render

it more efficient, and of effecting the desired object within a safe period."

Put shortly, I would say, the idea which should regulate practice is Help; help by facilitating, not precipitating, the course of labour; not to save time, but to sustain the vigour of the uterus and vital strength of the patient.

To do good and not harm, the time and mode of extending aid must be well considered, "care and judgment are required." A simple procedure may at one time facilitate, at another retard labour; under certain conditions it may be advisable, under others reprehensible. We can aid by opportunely rupturing the membranes; we intermeddle when this is done too early. We help in the third stage by the Credé method; those who deliver the placenta by at once introducing the hand, or by drawing on the cord, grossly intermeddle. We may interfere by version in a forehead presentation, but to turn when the vertex presents, because more expeditious, is reprehensive intermeddling.

The favourable course of labour is characterised by a co-operation of distinct forces and a regular sequence of changes already discussed (*vide* p. 292). Defects, however, and irregularities occur, which experience has taught may likely hinder and may be injurious. Whenever any condition is found to be entailing, or is known to entail, an unnecessary expenditure of energy, aid should be given. Every act in this direction must be warranted by a knowledge of the progress of the labour, of the conditions present, and of the effect likely to follow the act: errors arise from inattention or from ignorance.

The first stage is usually slow, at times very slow, and yet no derangement of the process or need to interfere. A *tardy* labour is different from a *retarded* one. It may be tardy from slow and feeble pains alone. If the natural sequence of changes is duly maintained, and the progress is proportionate with the pith of the contractions, forbearance must be exercised; action, not time, is the criterion. On the other hand, a labour is retarded when some condition renders a force, otherwise sufficient, ineffectual; as in premature escape of the liquor amnii: or when the condition disturbs the natural

sequence; as when undue strength of the membranes long delays their rupture.

Ineffective pains may be rendered effectual by pressure artificially made in the same direction and acting with the particular force that is defective. Thus digital dilatation may be of service when the wedge action is ineffective; but it is improper and possibly hurtful if employed against imperfect expansion and thinning. A large bag of waters at times makes an indifferent fluid wedge, or there may be no fore-waters; labour then, under certain conditions, may be facilitated by rupturing the membranes, even when the os is comparatively small.

These are illustrations. What has to be thoughtfully considered is the time and conditions warranting, and the mode of proffering aid. Knowledge and experience, not old time notions, must be applied in formulating the rules of practice.

Vaginal Examinations.—If we are to "ascertain accurately the progress of labour and be ready to obviate any irregularity which may occur," vaginal examinations must be made. They should be repeated as often as necessary information can be obtained by no other means, but not oftener. It is useless to pretend that external palpation can impart all, or anything like all, that is needed. To refrain from examining occasionally is to conduct labour in a haphazard manner. No doubt the end is favourable in many cases, by fair fortune, however, more than good guidance; just as numbers of cases terminate successfully without medical attendance.

There are risks in examining; but against these, nowadays, we are well provided; would that men were more assiduous in the use of the means. And Nature too can cope with germs beyond our reach, provided her power of resistance is not reduced. *To be heedless of exhaustion is to play into the hands of sepsis.*

OPPORTUNE AIDS IN THE FIRST STAGE.

When Labour is Uncertain.—The changes in the uterus preparatory to labour are occasionally associated with labour-like pains; these continue for some hours and then pass off. Each

recurrence raises the question—Is the patient in labour? This can be ascertained only by observing the changes in the portio already described (p. 291). Even when labour action has set in, progress may be retarded by adhesion of the membranes around the internal os.

When, then, the pregnancy is at full term, pains have been recurring for some hours, but the question of labour is still uncertain, it is well to pass the finger through the external os, as far as can be reached without undue force, and thereby ascertain whether the canal is effaced; if not, is the inner os closed and the membranes still adherent? If so found, they can be separated by gently sweeping the finger around. It must be done in an interval between pains, without any attempt to dilate the os; done once only, and not repeated at subsequent visits. By this means, I have found irregular, teasing, and useless pains checked, and the natural process facilitated.

Labour fairly set in. — When the cervical canal is found effaced, the portio flattened, the os beginning to open, and the outer ring slightly expanded, although obstetrically speaking labour has commenced, there is a disadvantage in letting the patient imagine that it is the hard work of labour. It will fortify her mind to be assured that all is well; the real work, however, is only beginning; this is the slow period, and it is better slow, especially in a first labour; the more courageously each pain is borne, the likelihood is fewer will be required.

Grasping the Situation.—In the early period of the first stage, the situation cannot be comprehended, or a reliable opinion formed, from the size and consistence of the os alone. Yet in reporting cases, how often is this all the information vouchsafed!

Dilatation of the os is not the *primary* change; expansion and thinning of the diaphragm must precede it. With the os yet small, the question is, how far is the outer ring dilated? This is readily ascertained by observing the degree of drawing up of the vaginal walls in the lateral fornices. To thoroughly grasp the situation, the size and consistence of the os, the width of the diaphragm, and the presence or absence of the wedge action must be taken into account. The fœtus, too, is not a negligible quantity; as before noticed, it has its influence, and so has the relative amount of amniotic fluid.

By the degree and sequence of changes, an opinion can be formed regarding the course of a labour. Under favourable circumstances, the two rings, inner and outer, dilate proportionately, the outer more or less in advance of the inner. If the progress be slow, but the sequence is not disturbed, the likely cause is weak or ineffective contractions; if these be fairly good and brisk, yet ineffectual, then the probable reason of the delay is deficient physiological relaxation of the tissues, as is often the case in elderly primiparæ. Time is required and forbearance must be exercised.

Irregularities, however, are frequent and various. For consideration, they may be grouped naturally according to the situation.

I. Conditions that interfere with the *initial* opening up of the os, meaning thereby the degree of patency required to allow the membranes to bulge into the ring.

II. After the initial patency, where the defect still lies with the inner ring, or with the wedge action.

III. Where expansion of the outer ring is at fault, hindering the natural dilatation of the os.

I. *The Conditions interfering with the Initial Patency of the Os* are evident at an early period; they are certain to retard progress, and if unrelieved give rise to a dangerous amount of thinning of the tissues, not of the diaphragm alone, but also of the lower uterine segment. They are—

1. *A Congenital Ring of Resistance in First Labours.*—The orifice of each canal—the urethra, vagina, and cervix—is anatomically marked by a circular band of connective tissue fibres, well defined when put on the stretch. It offers a varying degree of resistance to dilatation in different women. That forming the external os uteri makes the process of dilatation slow in first labours, and is invariably more or less torn. At times it is unduly firm and resisting, entailing many hours of ineffectual efforts to overcome it. This waste of energy should and can be prevented: 'tis late to recognise the cause when the evil is done.

If, then, labour action has been present for some time, the diaphragm thinned and expanded, but the os will not admit the finger, it is imperative to overcome the resistance. This is

done by digital dilatation. The finger-tip is placed directly over and perpendicular to the os, and with steady but not rude pressure, with a slight boring movement, the ring is made to yield. Dilatation should be continued till two fingers, one in front of the other, can be introduced, then further progress left to the natural powers.

2. *Backward Position of the Os Uteri.*—The initial dilatation is delayed also when the os is situated far back, beyond the ordinary range of the finger, and difficult to reach. The uterine force is being expended upon the anterior half of the diaphragm, which becomes greatly thinned, and may give the impression that it is the bag of waters and the outer ring the dilated os. Not infrequently this irregularity is associated with the former one—the firm closed os—considerably increasing the difficulty of ascertaining where the os is. It can always be recognised, however small, by the fibrous ring.

When, then, the os is far back, beyond the central line of the pelvis, I have always found it advantageous and safe, in the interval between pains, to pass the finger within the ring and gently draw the os forwards, using at the same time slight dilating action. The finger may be withdrawn at the onset of a contraction, or the improved position of the os retained by it during the pain. The manœuvre should be done once or twice, and the patient then left for a time.

II. *The Inner Ring alone at Fault.*—Here the os is comparatively small and resistant; expansion and thinning of the tissues are well advanced; the vaginal walls fully drawn up; and consequently the diaphragm is wide and markedly in evidence. This condition may be owing to the before-mentioned congenital ring, though enlarged, being unbroken, and persistently resistant; or it may be due to defective wedge action. On the other hand,

III. *When the Outer Ring is retarding Progress*, the vaginal walls are imperfectly drawn up; the diaphragm is narrow; the distance between the rings is not great.

First, With the forewaters present, the os may yield favourably till dilated to a certain degree, then it seems to become firm and resistant; it has, in fact, dilated as far as the

outer ring will permit; the two have blended into one thick ring, "a rigid os."

Secondly, When the membranes have ruptured, the head must take on the function of the wedge. This, however, so far as the inner ring is concerned, it is unable to do, until any obstruction from the outer ring is overcome. The latter must be sufficiently dilated to let the head reach the os, and the os again must be nearly half-way dilated before the head can engage it. When the outer ring so holds back the head during a pain, the tissue of the os will remain unstretched, whilst all around is tense.

Upon a clear apprehension of these different and distinct conditions that retard labour, depends the proper and safe use of means to facilitate the natural process of the first stage.

DIGITAL DILATATION.

This term should be restricted to such aid as can be given by the fingers in ordinary labours, and not applied to the forcible methods suitable only in cases of great urgency. Indiscriminate use has brought the practice into disrepute; opinions have varied regarding it from time to time, and the conditions warranting it have never been clearly defined. In text-books it is timorously spoken of, generally hedged round with many cautions, sometimes mentioned only to be condemned; and yet I believe there are few practitioners who do not practise it; experience teaches its value. When done judiciously, under proper conditions, and with due precautions, it is safe and beneficial.

The rule that should regulate the practice is, that *it is to be used for dilating the inner ring alone, and only when the cervical diaphragm is expanded and pretty well thinned.* It is liable to be unavailing and hurtful if practised when the margins of the os are thick, or the vaginal walls are not well drawn up. The method generally employed as against the inner ring is wholly ineffectual for dilating the outer. Where this is the resisting structure, a modification in the mode of acting must be adopted.

1. *When the Membranes are Intact*, the digital action should be applied in the interval between pains. One or two fingers

are introduced within the ring, and by putting the margins on the stretch, and gently sweeping the fingers round, a dilating force is exercised. It should be done deliberately, but not roughly, or for long at a time. If a contraction comes on, the fingers must be drawn from within the os, and the effect of the pain observed. It is then, while the tissues are tense, that the real size of the os can be properly estimated; when the tissues are lax, the os seems larger than when a pain comes on; this has given rise to the idea that the os can contract, but there is no sphincter here. Before repeating the manœuvre, it is well to wait the occurrence of two or three pains and observe the effect. Hasty or complete dilatation all at once is not the intention: here, too, forbearance is to be exercised.

2. *When the Membranes have Ruptured,* or before rupture if there are no forewaters, the conditions are different. The presenting part has alone to take on the wedge action. We have already seen that this is associated with difficulties: the natural fluid wedge is absent, and till the os is about half-way dilated the head makes a bad dilator. Here, if the diaphragm be sufficiently thinned, we should supply, by digital aid, a dilating force for that which is lost. It is to be done as before described, but now during a pain, not in the interval, and continued with each pain until the head can take on the action. With good contractions, progress thereafter is often rapid.

3. *With a Faulty Outer Ring.*—If, from insufficient expansion, the head be held back from the os—at present we do not include a contracted pelvis—it were well to wait until fuller expansion allows the presenting part, during a pain, to come in close contact with the os, and the tissues put well on the stretch. Digital dilatation may then be used, as before, until the head can act as the wedge; no attempt, however, must be made thereby to influence the outer ring. It is now when conditions are favourable for the action of the head that the manner of operating should be changed. The modification is the only artificial means of dealing with an insufficiently dilated outer ring. It may be designated

LETTING SLIP THE OCCIPUT.

To do this effectively, safely, and in no way derange the natural mechanism, it is necessary to know accurately the

position of the occiput in the pelvis. Wait until the head is engaging the os, then, as soon as a pain commences, two fingers are to be placed on the margin of the os nearest the occiput, and by steady but not too forcible pressure in the direction of that bone, favour the slipping of the os over it, or rather, it should be said, facilitate the descent of the occiput through the os. At the same time the patient should be urged to bear well down.

Professor Burns states: "*This is an old principle*, but it was rashly practised and too universally adopted, which made it meet with just reprobation." Nevertheless he recommends it, and says: "The dilatation is easily and safely effected if the case be proper for it." He failed, however, to grasp accurately the principle, for he says: "We may place two fingers on the margin of the os, *which is next the pubes*, and gently assist it, during the pains, to slip over the head." Now, if so done irrespective of position of the head, in occipito-posterior cases it would favour the descent of the sinciput instead of the occiput, and so derange the normal mechanism. The point acted upon must always be that corresponding with the hind part of the head.

The effect is surprising and gratifying; it secures good flexion of the head, and thereby facilitates the mechanism of the second stage. When the head thus makes its exit through the os by a flexion movement—the forehead arrested and the occiput advancing—there is less risk of injury than when pressed onwards, without this movement of rotation on a transverse axis. Undue thinning of the diaphragm and defective flexion of the head in passing are ready causes of lacerated cervix; they may be as readily obviated by skilful management of the labour.

ARTIFICIAL RUPTURE OF THE MEMBRANES.

The question, when to rupture the membranes, is in need of revision. The very old idea that they should be left intact till at the orifice of the vagina, has been entirely abandoned. In some text-books of to-day it is said that they should not be ruptured "till they reach the floor of the pelvis." The opinion now generally accepted is that they should be ruptured

when the os is fully dilated, but not till then. The expression "fully dilated," however, is somewhat elastic.

The views I have long held and taught are that to retain the forewaters after their function is fulfilled is but to retard labour. Their function, in the first place, is to expand the lower uterine segment and cervical diaphragm; and secondly, to dilate the os until the head, free to advance, can effectively engage the inner ring. The time, therefore, when under ordinary conditions the membranes may be ruptured with advantage, is when the os is half-way dilated. Further, under certain conditions known to retard labour, the practice may be adopted with benefit at even an earlier period.

There are conditions, however, where it is advisable to delay longer than in others. Wait longer in first than in subsequent labours; wait longer when the tissues are not well relaxed than when soft and dilatable; and better wait for full dilatation when there is any reason to fear that the vertex is not the presenting part, or that there is some obstruction to the descent of the head.

The conditions calling for interference at an earlier period are as follows:—

Hydramnios is admittedly one, but in the previous paper (pp. 296-8), when discussing the influence of quantity of liquor amnii, it was shown that an excess likely to retard labour begins when the amount of fluid is sufficient to separate the fœtal body entirely from the uterine walls, for then there can be no direct pressure on the fœtus till the waters have escaped.

How to Estimate the Relative Amount of Liquor Amnii.—External manipulation is not sufficiently reliable. A large excess can readily be made out, but a lesser quantity—one still liable to retard action—can be determined accurately, only by observing the effect of a contraction, *per vaginam*.

It is evident that the larger the quantity of fluid, the greater will be the mobility of the child. With a favourable or scanty amount, the fœtus, at the onset of labour, will take up and retain a definite position: advancing with a contraction and receding with the relaxation. When, however, this is reversed, and the head is observed to recede during a pain, it shows that the quantity of fluid is considerable, and sufficient to throw the

fœtus out of action; the forewaters are not yet divided from those above; there is no direct pressure, the fluid pressure alone is acting. A similar condition of relative excess may be recognised when there is a difficulty in reaching the presenting part, owing to a large bag of forewaters; a full bag not infrequently makes a bad dilator.

Now, under these conditions, there is not necessarily a call to interfere; watch the progress. The full bag may be capable of efficiently dilating the os; the quantity of fluid is evidently considerable; yet, if dilation be duly progressing, forbearance should be exercised during the early period. When, however, progress is unduly slow, and the force is being spent more on greatly thinning the tissues than on dilating the os, it is better to rupture the membranes, provided external examination gives assurance that the lie of the fœtus is normal, and there is no reason to suspect narrowing of the brim.

Two irregularities, however, may develop, either of which warrants early interference. In the one, the membranes do not bulge into the ring, but lie flat across it—this may happen with a full, spherical bag; the other is where they protrude largely in a sausage or cyst-like form.

In the first, the uterine force is being spent in expanding only and thinning the tissues; there is no true wedge action. In such circumstances we might aid digitally before rupturing the membranes, but there is danger in this condition continuing too long, for till the excess of fluid has been reduced, the thinning of the tissues may be extending up in the lower uterine segment to a dangerous degree. It is better then to rupture the membranes, and afterwards dilate if necessary.

In the second—the cyst-like form—notwithstanding the marked protrusion, or rather because of it, dilating action is impaired or rather lost, the energy being spent on the protrusion, not on the ring. When the bag of waters is occupying the vagina, one is apt to be deceived, thinking the first stage is over, and on rupturing the membranes be disappointed to find the os still small. This form of irregularity is liable to occur with abnormal presentations and in contracted pelves; therefore in all such cases, before operating, assurance should be obtained on these points, and action taken only when

prepared to follow up with whatever further steps may be necessary.

Absence of the Forewaters.—At times there are little or no forewaters; the membranes lie in contact with the head, and attention is necessary to decide whether they are ruptured or not. The head alone occupies the lower segment; the girdle of contact fits accurately, so that with increased pressure no fluid passes from above. Here it is evident that the quantity of liquor amnii is relatively small, and the breech is in contact with the fundus, allowing no upward fœtal movement; during contraction, however, direct pressure can be relied on. Nothing is to be gained here by retaining the membranes intact. The situation is similar to where the waters have escaped prematurely, with this difference: when the membranes are intact, freedom of onward movement is at a minimum; when they are ruptured, the freedom is increased. Under the above conditions a mechanical advantage is gained by artificially rupturing the membranes; and all the more is this desirable, because the natural means of bursting them is absent. Thereafter if the os be too small for the head to engage it, digital dilatation may be used, as before described; but it is always prudent not to be officious, or too anxious to precipitate action: if, however, the tissue of the diaphragm be very thin, better at once to dilate artificially, lest a strong pain suddenly drive the head through, with laceration, as is sometimes the case with the perineum.

An After-word.—There are times when the best way to secure safe delivery is to postpone labour. Before resorting to the above methods of facilitating the process, one must consider whether a temporary rest will not be more beneficial. The question turns largely on how far the contractile vigour of the uterus has been declining, or is being influenced by an irritable or disheartened mental state. "When the pains diminish in force and frequency from fatigue, the indication is to give a temporary rest" (Playfair).

The probable after-duration of the labour, were aid proffered, has also to be considered: the first stage does not stand alone, much expenditure of energy has to follow. In a first labour, or at any time when imperfect relaxation foreshows a tardy

progress, a rest will be more imperative than when the tissues, being soft and yielding, give promise that, once some defect has been corrected, the labour will progress satisfactorily.

If exhaustion be evident, and pains diminishing in force and frequency, the more complete the rest the better. To secure this, opium in a full dose, not less than two grains, must be given. But if the opinion is hovering between helping on and arresting, one grain may be tried; it steadies the system, and its first effect is sometimes to promote uterine activity.

Nervous irritability and hysterical manifestations may interfere with the regularity and strength of uterine contractions, increasing the interval or making the pains frequent, short, or teasingly ineffective. This, probably, is the sphere for chloral—30 grains, and an additional 15 grains twice at intervals of an hour, if required (Kain, New York); but I have had little experience of it, finding plain speaking and encouragement as mental physic very beneficial. Cocain to a refractory os I have never used, and am sceptical of its supposed effect.

By getting rid of old erroneous ideas, and acquiring scientifically accurate modes of thought, obstetrics can be advanced; by clearly defining the principles of action, and the conditions warranting interference, practice can be improved; but each one must acquire for himself the ability to recognise the said conditions and to comprehend the truth of the principles. This is gained gradually, but comes more surely to one by the careful study of the few, than by an indifferent attendance on the many.

OBSERVATIONS ON THE USE OF FORMIC ALDEHYDE AS A MILK-PRESERVATIVE [1]

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THE use of small quantities of suitable preservatives for milk, especially during summer weather and in large cities, is by no

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means universally condemned by sanitarians. At the Sanitary Congress held in Bradford in July 1903, Dr Moore, of Huddersfield, in a paper on "The Application of the Food and Drugs Act," said that great advantage would result if a tribunal, having an improved means of estimating the value of scientific evidence, could be provided. Real advantage to the public would result if independent and specially qualified assessors were appointed to assist magistrates, just as nautical assessors were appointed in maritime matters. There would be fewer instances then of magisterial "eccentricities." Under certain circumstances, foodstuffs might with advantage be mixed with preservatives. By this means, articles of a perishable nature could be preserved and an abundant supply maintained, with the result of keeping the cost low. Under existing circumstances this was not what happened. On the contrary, the dealer used preservatives to conceal the staleness of his goods, and sold them as of, and at the price of, the best quality (Report of Proceedings). In the end, after discussion, the conference was unanimous in passing a resolution to the effect that whenever preservatives are added to food, their presence, nature, and maximum amount should be indicated on a label or otherwise declared. With this every fair-minded person will agree. In a recent number of this Journal (February 1905), Dr Aitchison Robertson touches on this point, towards the end of his interesting paper on "Considerations relating to Milk-Supply," and points out that if the legislature would allow small but adequate quantities of certain antiseptics to be added to perishable articles of food, no harm would result to anyone, but good rather would accrue. Under the present conditions of our milk-supply in towns, he considers it only proper that small (but known) quantities of preservatives should be added to milk during the warmer months of the year, and believes that thereby the onset of diarrhœal diseases might be prevented. It is, of course, retorted that since, for a supply of good fresh milk in town, great care and cleanliness are needed, the employment of anything that would tend to lessen such care and cleanliness would be most pernicious. It must, however, be borne in mind that it is recommended that all "preserved" milks would need to be declared as such, and, since many people would still request pure, fresh, untreated milk,

as great care as ever would be requisite to meet this demand. Besides, after all, the legalising or not of milk preservatives does not really affect the question of a pure milk-supply as far as the rest of the matter is concerned, which is, that whether or not such preservatives are used, sanitary authorities should enforce existing laws and orders relating to cowsheds, dairies, etc., with the utmost stringency, and should do all in their power to lessen the deplorable conditions which at present only too commonly prevail. When that is done, and a sanitary conscience has been awakened in our milk-purveyors and milk-vendors, the use of preservatives will happily become unnecessary.

If any preservative is to be used, it must be one that will keep milk sweet when added in but very small traces, which will not be recognised by taste, and which will have no harmful effect either upon the digestive functions or upon the tissues of the alimentary canal, the kidneys, or other organs. When the power which formic aldehyde possesses of retarding putrefaction became known, it was naturally considered as admirably suited for use in preserving milk, and Allen, in his "Commercial Organic Chemistry" (vol. iv.), stated as his opinion that it was one of the least objectionable that could be used. Its use, however, has been severely animadverted upon, and in many places has been entirely forbidden. In the Report of the Departmental Committee appointed to consider the question of the addition of preservatives and colouring matters to foods and published at the end of 1901, the opinion was stated that formic aldehyde should be entirely prohibited, this opinion being based, in part at least, on experiments that were practically worthless, since the weakest formalised milk used in the experiments contained (as a rule) ten times as much formic aldehyde as a formalised milk in commerce would. Dr W. D. Halliburton published experiments of this kind in the *British Medical Journal* for 1900 (vol. ii. p. 1), in which he tested the effect of formalised milk on gastric, salivary, and pancreatic digestion, and on the curdling of milk by rennin, before giving evidence before the committee already referred to, and in the experiments he rarely used a milk with less formic aldehyde than 1 in 2000 (0.05 per cent.), which is at least ten times as much as would be used in trade. He speaks of the in-

hibitory effect of formic aldehyde on rennin action in what he considers evidently a very weak solution, viz., a few drops of a 0.2 per cent. solution in one ounce of milk. But in this case the dilution would be less than 1-5000, and such strength would never be used for ordinary milk-preservation, where 1-20,000 and much less is quite efficacious. It seems to me that tests of this kind tell unfairly against a substance which has a great deal to recommend it, and it is a case of "give a dog a bad name," for formalin in milk generally is looked upon with great disfavour. During the past few years I have made a large number of observations on the preserving power of formic aldehyde on milk, its mode of detection and estimation, and its effects on the digestive processes, and am satisfied that the dangers of that substance have been considerably exaggerated where it is used in a very high dilution. In the carrying out of these observations, especially between 1903 and 1904, I was materially aided by a grant for Scientific Research given by the Carnegie Trustees.

1. *The Prevalence of Milk-Preservatives in Glasgow.*

Large quantities of milk come into Glasgow every morning from the adjacent counties, particularly from the upper parts of Lanarkshire, Renfrewshire, and Dumbartonshire. A good deal comes from Stirling; Ayrshire and Lower Lanarkshire are sources largely drawn upon, and both Wigtownshire and Dumfriesshire are laid under contribution. As far as my experience goes, the quality of the milk is good, and the use of preservatives is moderate. In 207 samples which I have analysed, the following results were obtained:—

In 84 analyses for formic aldehyde, all were negative.

In 71 analyses for boric acid and borax, positive result was obtained on 15 occasions.

In 52 analyses for salicylic acid, all were negative.

Of the cases in which boric acid or borax was found (15 out of 71), we have a percentage of 21.1; in 6 of these cases traces only were found, leaving 12.6 per cent. where the amount was distinct. The dairies from which the borated samples were obtained were by no means all in very poor localities; indeed, the majority of these were in the western

part of the city, supplying, in many cases, good residential neighbourhoods. The samples were not all taken in summer, but the majority of instances where the preservative was found occurred during the warmer months of the year (April to September).

2. *The Chemical Reactions of Formic Aldehyde and the Best Means for its Detection in Milk.*

Formic aldehyde (H.COH) being a gas, is not used in that form, but in the saturated watery solution so well-known by the name of formalin or formol. This contains 40 per cent. of the gaseous aldehyde when of full strength, is a clear, transparent fluid, of a hot and disagreeable taste, and gives off a vapour that is very irritating to the nasal mucosa and the conjunctiva. Where it is added to milk in any large amount, the taste is readily perceived. Formalin solution is acid owing to the presence of traces of formic acid ($H.CO_2H$); its density is 1.070. A good sample should not contain more than 0.1 per cent. of formic acid, nor more than traces of chlorides, sulphates, or heavy metals. A solution of formic aldehyde readily reduces Fehling's solution, and deposits metallic silver from a solution of the ammonio-nitrate.

The following are the tests for formic aldehyde in milk which I have most frequently employed :—

1. *Hehner's Sulphuric Acid Test.*—This depends on the fact that formic aldehyde, milk, and sulphuric acid (containing a trace of ferric chloride as an oxidising agent) yield a violet coloration. Richmond and Boseley recommend that the milk be diluted first with an equal volume of water, and that 90-94 per cent. sulphuric acid be used. I have usually performed the test by placing in a test-tube 5 c.c. of 94 per cent. sulphuric acid, and allowing the diluted milk to fall upon it by a pipette from an inch above the acid, so as to cause a little mixing. The fluids, however, form a fairly sharp interface, and if formic aldehyde is present a violet ring is observed where the liquids join. In normal milk the ring is greenish. The violet colour remains for several days. It should be noted that *milk* must be present for this test to succeed, the existence of casein being essential. If therefore the test is

applied to wine or vinegar, a drop or two of milk must be added. Further, the sulphuric acid should be "commercial," that is, should contain traces of iron salts. The test is employed by the State Board of Health of Massachusetts, hydrochloric acid and milk being mixed together, ferric chloride added, and the mixture boiled, with stirring.

As regards delicacy, this test is most suitable for milks containing little of the preservative; indeed it fails if more than 0.5 per cent. (1-200) be present. Trying it with milks containing varying amounts of formic aldehyde, I obtained the following:—

Dilution.	Reaction.
1- 2000	Very distinct.
1- 10,000	Very distinct.
1- 20,000	Distinct.
1- 40,000	Distinct.
1-100,000	Visible.
1-200,000	Negative.

The test is, therefore, one of considerable delicacy, and the violet ring remains visible for several days.

2. *Hehner's Phenol-Sulphuric Reaction.*—This reaction is delicate, and can be obtained with any strength of the preservative. It can be done with the milk direct, but it is better to use the distillate. To this a drop of aqueous solution of phenol (1 in 20) is added, and the fluid is poured on to strong sulphuric acid, when, if the reaction is positive, a red or crimson ring forms at the interface. If the amount of formic aldehyde be at all great, a milky turbidity appears above the red zone. I have found this test respond well with milk containing only 1 in 50,000 of formic aldehyde. On distilling 100 c.cm. of such milk and testing the first 5 c.cm. of the distillate, a very clear reaction was obtained. Still more dilute solutions than this will respond.

3. *Jorissen's Phloroglucin Test.*—This I have frequently employed, and find it is an excellent test, very simple and easily performed. The reagent employed is phloroglucin (tri-hydroxy-benzol, $C_6H_3(OH)_3$ 1:3:5), which may be suitably employed in a 1 per cent. solution in water. To 10 c.cm. of the suspected sample add 1 c.cm. of the phloroglucin solution

and 2 c.cm. of 10 per cent. solution of potassium hydrate, when, in a positive test, a pink-red, light pink, or pale brown colour will develop according to the amount of formic aldehyde present. The colour appears rapidly; for example, in a solution of formic aldehyde in milk of the strength of 1-10,000, a pink tint will show in 30 seconds, attaining its maximum in 60 seconds. In all strengths the solutions tested assume a very pale lemon or sulphur colour on standing. In non-formalised milk no colour at all appears; the milk simply looks a little more transparent. I consider this test a very satisfactory one, but ethylic alcohol responds to it.

4. *Tatham Thomson's Silver Nitrate Test.*—Mention has already been made of the reducing power of formic aldehyde; this is taken advantage of in Thomson's test, where the distillate from suspected milk is treated with a few drops of 2 per cent. solution of ammoniacal silver nitrate and kept in the dark. If the reaction is positive, in twelve hours a dark discoloration of the fluid, due to the separation of metallic silver, will be apparent; a light brown may be disregarded. Other aldehydes may lead to a darkening of the milk, but they certainly do not seem to respond nearly so readily as formic aldehyde does, nor when present in very small quantities. As already stated, the distillate from the milk is used, 100 c.cm. of milk being distilled till from 20-30 c.cm. have come over. As a rule, nearly all the formic aldehyde originally present is found in that distillate. As far as my personal experience goes, I have been led to prefer Hehner's or Jorissen's reaction to that of Thomson; in the former the diagnostic reaction is usually unequivocal, while in the latter there is often a slight brown tint. Further, the test requires twenty-four hours for its completion, whereas the two first mentioned can be carried out in a couple of minutes.

5. *The Resorcinol Test.*—Resorcinol (di-hydroxy-benzol, $C_6H_4(OH)_2$ 1:3) is a brown, curry-like powder, smelling somewhat of iodoform. It is soluble in water, alcohol, or ether. It is employed, like phloroglucin (tri-hydroxy-benzol), as a test for formic aldehyde, as it, like the former, develops a red colour with formic aldehyde in the presence of an alkali. To perform the test, take 10 c.cm. of the suspected milk, add an

equal volume of 5 per cent. caustic potash, and 0.5 grm. of resorcinol. On shaking, a light brown turbid fluid results, whether the milk be pure or not; but on boiling, a normal milk becomes a deeper brown, while formalised milk yields a distinct reddish colour. I have not found the test very delicate, and it certainly cannot compare with the phloroglucin reaction.

6. *The Magenta Test.*—Schiff has suggested the use of a reagent which consists of a solution of magenta decolourised by sulphurous acid; an excess of the latter must be avoided. The sample of milk is curdled by dilute sulphuric acid, filtered, and the filtrate treated with a few drops of the reagent, when formic aldehyde produces a purple-red colour. The reagent is readily made by taking a dilute solution of fuchsin (the ordinary Ziehl-Nielsen stain much diluted does quite well), and carefully adding sulphurous acid till the fluid is colourless. Hehner recommends that 100 c.cm. of the sample should be distilled and the first 25 c.cm. of the distillate placed in a stoppered cylinder along with five drops of the reagent. The colour is observed next day, and any due to oxidation is removed by adding a little more sulphurous acid. What persists is due to formic aldehyde, and is usually of a light purple or violet tone.

The test is fairly sensitive. I find that with 5 c.cm. of aqueous solution of formic aldehyde (1-5000), a delicate lilac colour appears in two minutes and becomes a distinct violet in four. With 5 c.cm. of a solution of a 1-10,000, it takes four to five minutes to develop a pale violet tint. These colours are permanent, and do not go on the addition of sulphurous acid. Ordinary aldehyde (CH_3COH) responds to this test, but acetone does not.

7. *The Ortho-methyl-amino-phenyl-sulphate Reaction.*—In the *British Medical Journal* of March 21, 1903, Saul described a reaction with the above-named chemical and peroxide of hydrogen, by which it was possible to distinguish raw milk from boiled, the former yielding a fine deep pink tint, and the latter showing no change of colour. This change he suggested might be due to the action of a ferment in milk destroyed by boiling. In a paper which I published in the *Lancet* (July 1903, p. 24), I further studied this phenomenon, to which I gave the name of the *ortol* reaction, since the chemical

mentioned by Saul is most easily obtained in the photographic reagent ortol. A 1 per cent. solution of this does for the test, along with one drop of weak peroxide of hydrogen solution. This reagent without the addition of hydrogen peroxide will yield a pink colour with formalised milk on standing. This is not a specific reaction for formic aldehyde, but is simply an accelerated production of the colour which normally appears in any case, in course of time, in a milk free from the aldehyde. The colour produced in formalised milk is quite distinct and persists for hours. The reaction was tried with normal, formalised milk, milk containing ordinary aldehyde, and milk with acetone, and in half an hour there was a distinct pink in the milk with acetone (most marked) and with formic aldehyde, and in normal milk, while that containing acetic aldehyde showed but a slight change. This reaction, though interesting, is therefore not peculiar to formic aldehyde, but is shared generally by the aldehydes and ketones.

There are other tests proposed for the detection of formic aldehyde, as, for example, the di-amino-phenol-hydrochloride reaction suggested by Mauget and Marion, with which I have no acquaintance, but of the seven detailed above, Hehner's with sulphuric acid, and Jorissen's phloroglucin reaction will be found very useful. Taking a milk and adding full strength formalin till the proportion of formic aldehyde was 1 in 50,000, it was found:—

(*a*) That 5 c.c. reacted promptly to the phloroglucin test, showing a pink tint in fifteen seconds.

(*b*) That with Hehner's sulphuric acid test, a distinct violet ring was obtained, a control of pure milk yielding a green zone.

(*c*) That with Hehner's sulphuric-phenol test a rose ring was obtained, the colour in the control being yellowish-brown.

(*d*) That Thomson's silver nitrate test gave a doubtful reaction.

Such a milk reacted as follows with strong mineral acids:—

(*a*) With an equal volume of ordinary strong hydrochloric acid it gave a fine pink tint in the cold, changing on heating to a beautiful purple; a control gave no pink tint, and on heating simply grew dark brown.

(*b*) Strong nitric acid (equal volume) produced, alike in the formalised milk and in the control in the cold, a bright yellow coloration.

(*c*) Strong sulphuric acid (94%) added in equal volume produces quickly a deep purple in the cold, while a control yields a greenish-yellow tint, rapidly changing to a coffee-brown, and eventually to black.

Even with a milk containing 1 in 90,000 of formic aldehyde a distinct violet ring is obtained with Hehner's sulphuric acid test; the phloroglucin reaction shows a very pale pink in five seconds, attaining a maximum in thirty seconds; strong sulphuric acid gives a distinct general purple in the cold, and strong hydrochloric acid causes no change of colour in the cold, while on boiling a delicate lilac-pink hue becomes apparent. It is thus clear that in practice, very small amounts of formic aldehyde in milk can be detected.

Before leaving the purely chemical part of this subject, I desire to touch briefly on two matters not yet considered, viz. the determination of the acidity of formic aldehyde, and the quantitative estimation of the actual amount of the aldehyde (H.COH) in any sample.

The Acidity of Formic Aldehyde.—As already mentioned, a good solution of formic aldehyde (formalin) should not contain more than 0.1 per cent. of formic acid ($H.CO_2H$). The acid is very irritating, and it is therefore desirable that it should be reduced to a minimum amount. It is readily estimated by the use of deci-normal caustic potash, with phenol-phthalein as an indicator, precisely in the same way as the total acidity of gastric washings is computed. In actual practice, 10 c.cm. of the formalin are titrated with the alkali, till neutralisation is obtained, and the number of cubic centimetres of caustic potash solution employed multiplied by 0.0046 (derived from 46—the molecular weight of formic acid), gives the amount of acid present in the quantity of sample taken. For example, in testing one of the samples of formalin (of full strength) which I used in experimenting, it was found that 10 c.cm. required 1.5 c.cm. of $\frac{N}{10}$KOH for neutralisation.

Then $1.5 \times 0.0046 = 0.0073$ grms. formic acid in 10 c.cm. formalin = 0.073 per cent., which is below the maximum 0.1 per cent.

The Determination of the Amount of Formic Aldehyde in any given Sample of Formalin.—Specimens of formalin on the

market do not always contain the full amount of 40 per cent. formic aldehyde, and it is necessary, therefore, before using any such specimens for purposes of experiment, to determine exactly how much of the aldehyde is present. The method I usually employ is that described by Schiff (*Zeits. Pharmak.*, 1903, 109), in which the formic aldehyde, neutral ammonium chloride, and normal solution of caustic potash, are allowed to react together, the former two producing hexamethylentetramin, $N(CH_2)_6$, and liberating hydrochloric acid, which is neutralised by the caustic potash, thus :—

$$6H.COH + 4NH_4Cl + 4KOH = N_4(CH_2)_6 + 4KCl + 10H_2O.$$

The more formic aldehyde present, the more caustic potash is required to produce final neutralisation. In actual practice, 10 c.cm. of the sample are taken, made up to 200 c.cm. with water, and neutralised if acid. The fluid is filtered, and to 10 c.cm. of the filtrate there are added 3 to 4 c.cm. of water in which 0.5 grm. of neutral ammonium chloride has been dissolved. Normal caustic potash is then run in cautiously from a burette till the fluid is just alkaline, litmus being used as the indicator. Each cubic centimetre of potash solution used, multiplied by the factor 0.045, gives the amount of formic aldehyde in the quantity of sample taken. Thus in one sample tested, I diluted 5 c.cm. to 200 with water, and used 10 c.cm. (equal to 0.25 c.cm. of undiluted sample) for the estimation. To this were added 3.7 c.cm. of water containing 0.5 grms. pure ammonium chloride, and it was found that 1.8 c.cm. of normal potash were required to effect neutralisation.

Then $1.8 \times 0.045 = 0.081$ grms. formic aldehyde in 0.25 c.cm. of undiluted sample, and accordingly $\frac{100 \times 0.081}{.25}$ $= 32.4$ is the percentage.

Another method of doing this estimation, and based on the same chemical reaction, had been described before this by Carl E. Smith in an exhaustive paper published in the *American Journal of Pharmacy*, 1898. He recommended that 2.25 grms. of the sample, 2 grms. of ammonium chloride (dissolved in 25 c.cm. water), and 25 c.cm. of normal caustic potash should be mixed in a stoppered flask and left for several hours. At the end of that time the amount of potash left was determined by titration with normal sulphuric acid,

and the difference gave the amount that had entered into the chemical reaction already described. Working with 2.25 grms. of sample, every 1 c.cm. of potash consumed is equal to 2 per cent. of formic aldehyde, so that if a sample of formalin is full strength, it would lead to the using up of 20 c.cm. of the potash.

3. *The Preserving Power of Formic Aldehyde.*

A large number of observations were made on the preserving power of this aldehyde when added to milk. It must not be imagined that it has the power of rendering milk sterile when added in small quantities, or of preventing the development and action of various micro-organisms. Like other milk-preservatives, it simply prevents the souring of milk, and greatly inhibits the activity of the *bacillus acidi lactici*. But this souring is the earliest occurrence in warm weather which makes milk unsuitable for human food and leads to its rejection, and it is a serious question, as already stated, whether the use of small quantities of preservatives should not be allowed (their presence and amount always being declared), just to keep milk sweet in warm weather for, say, 20-24 hours after milking. It may be replied to this that this addition will not affect the great majority of organisms in the milk, but will merely mask their presence; but it must be remembered that if the milk kept sweet without any preservative for 20 hours, we would have just as many organisms present (perhaps more), and this milk would be, and is, largely consumed by all classes of the community. The diminution of the total organisms in milk is not to be accomplished by the addition of any preservative, but by attention to those rules of dairy-hygiene suggested by Dr Aitchison Robertson in the February number of this Journal.

The proportions of formic aldehyde in the samples used for testing the preserving power were as follows:—

1- 5000	1- 50,000
1-10,000	1- 60,000
1-20,000	1- 70,000
1-25,000	1- 90,000
1-30,000	1-100,000.
1-40,000	

(1) Strength, 1-5000.—The control milk set up at the same time as the formalised, and kept under the same conditions, was sour in 24 hours, while that with the aldehyde remained sweet till after 72 hours; by 96 hours it had a peculiar disagreeable taste, and next day it was putrefying. In this strength the preservative is at once perceptible to taste, producing a peculiar hot sensation in the pharynx; it would, of course, never be used in so large a quantity as a milk-preservative. In this proportion the latter is a powerful retarder of bacterial activity. I took, for example, some of the formalised milk of 48 hours' standing, which was still sweet, and inoculated it with some sour milk from the control. The inoculated milk never gave evidence of any action of the bacillus acidi lactici, but was quite sweet after the lapse of another 24 hours, and after 48 was not yet sour, although it had a peculiar taste. Next day it was decomposing.

(2) Strength, 1-10,000.—Milk of this character kept at room temperature always remained sweet at least 48 hours, whereas the control was practically always sour within this time. On two occasions the milk remained sweet for 72 hours, and once even as long as 79, but after that time altered in character, sometimes becoming sour, sometimes altered and peculiar in taste, going on to decomposition. Milk with 1-10,000 formic aldehyde has a taste of the latter that is perceptible.

(3) Strength, 1-20,000.—In general, milk with this amount of formic aldehyde kept sweet for 48 hours, though on one occasion the milk was curdled by this time and sour. Forty-eight hours of freedom from souring may be taken as the average, but on one occasion (July 1904), at room temperature, such a milk kept right for almost 80 hours, the control milk having soured 27 hours earlier. The aldehyde is barely perceptible in this dilution, by the palate.

(4) Strength, 1-25,000.—Only one observation was made at this dilution. The milk taken was probably 7 hours old (from milking), and a control, along with the formalised milk, was put up at room temperature in January. The control remained sweet for 24 hours, but by 48 hours had soured. The milk with the formic aldehyde was sweet even after the lapse of 72 hours.

(5) Strength, 1-30,000.—When a dilution of this degree was employed, it was found that whereas in a room in July the control kept sweet for 48 hours, the sample with the preservative remained free from souring for as long as 72 hours. By 76 hours, however, it was found to be just turning. This amount of formic aldehyde stated in weight as grains per gallon of a milk of specific gravity 1032, is about 2.40 grains of aldehyde per gallon.

(6) Strength, 1-40,000.—When milk was examined with formic aldehyde present in this amount, it was found that it remained sweet and natural for 24, but not for 48 hours, the control milk being curdled slightly at 24 hours, and markedly so at 48. The formalised milk was just turning at 48 hours, and had a peculiar taste. The preserving power was obvious, though not very lasting. Such milk would contain about 1.8 grains of formic aldehyde per gallon.

(7) Strength, 1-50,000.—When this small proportion of the preservative was added, the milk did not always remain sweet longer than the control. It did sometimes, however, on one occasion being all right 48 hours after being set up, while the control was sour by this time. Five hours later the formalised milk was "turning," and by 72 hours was quite sour. There was no taste of any preservative perceptible.

(8) Strength, 1-60,000.—Only one sample was tried of this dilution. Put up along with the control at noon, in April, at room temperature, when the milk was perhaps 7 hours old, it was found to be natural and sweet, but weakly acid, 24 hours later; at this time the control was slightly curdled, but not distinctly sour, with an altered taste, and very acid in reaction. Next day both were very sour, much curdled, and very acid.

(9) Strengths, 1-70,000, 1-90,000, and 1-100,000.—Milks were tested containing formic aldehyde in these very small proportions, which, it was found, were inefficient to preserve. In the proportion of 1-70,000 it was observed that there was a little less souring at a certain time than was observed in the control, but the difference was slight, and in neither case could the sample possibly be regarded as "sweet." In strengths of 1-90,000 and 1-100,000 no difference could be detected between the formalised and control milk.

Two facts emerge from a consideration of these tests on preserving power. The first is, that with a rather large amount of formic aldehyde present, no souring occurs, the milk keeping sweet at first, and later on rather undergoing a putrefactive change. With strengths of 1-5000 and 1-10,000, the activity of the bacillus acidi lactici is thus markedly inhibited, and, as noted already, the addition of actually soured milk to fresh milk containing 1-5000 of the aldehyde leads to no extension of the souring. When we deal with milks of the strength of 1-20,000 and dilutions beyond this, we see that the milk, when it does begin to change, undergoes ordinary souring like the control. The action of the bacillus of lactic acid is thus merely delayed, not prevented. This is an important matter, because it has been said (and the statement would carry great weight if it were true) that the use of such a preservative would be really harmful, inasmuch as it would mask the changes taking place in milk through the activity of organisms of putrefaction, and that as the danger signal of "souring" would be awanting, such a milk might be consumed and do much harm. As, however, with dilutions beyond 1-20,000 (and such dilutions would always be employed in the dairy industry), souring occurs as a practically invariable rule, this argument loses its weight; the milk is simply kept sweet for a slightly longer period than it otherwise would, and becomes "turned" in due course like any ordinary specimen. It ceases to be consumed, therefore, long before any putrefactive changes have set in.

The other point on which comment must be made is, that in order to keep a milk sweet for, at any rate, 30 hours from time of milking, it is not necessary to employ formic aldehyde in a greater proportion than 1 in 40,000 (.0025 per cent.). With a strength of 1 in 30,000, milk could be kept sweet for from 48 to 72 hours, and with 1-40,000 from 24 to 48 hours. When we come to 1-50,000 we find the effect of the preservative sometimes very dubious, and with weaker mixtures no reliable preservation can be attained. In the case of a strength of 1-40,000 there would be about one-quarter of a grain of formic aldehyde in an imperial pint, or say one-eighth of a grain in a tumblerful of milk. A milk containing 1 in 30,000 will be preserved still better, but certainly if this preservative

should ever be legalised, it would not be necessary to use larger quantities than this. We may accordingly conclude that we are dealing here with one of the most efficacious preservatives known.

4. *The Effect of Formic Aldehyde on the Digestive Ferments.*

Much has been written and spoken on the harmful influence exerted by this preservative on the digestion of foodstuffs to which it has been added. Some of the opinions held regarding this matter are, I believe, susceptible of revision, for there is little doubt that in many of the experiments on which these opinions were based, far too strong solutions of the aldehyde were employed. Tests have often been carried out with solutions of 1 in 2000 (0.05 per cent.), whereas no solution containing more than 1 in 20,000 (0.005 per cent.) should be considered.

A. Action of Formic Aldehyde on the Action of Rennin.—It was found, on taking 40 c.cm. of a pure, fresh milk in a beaker at a temperature of 37° C., that the addition of one drop of a good essence of rennet induced curdling in 20 seconds, the curdling being quite complete in 40 seconds. Only once was it noted that it took as long as 25 seconds for the curd to begin to form, and complete curdling was never delayed beyond 40 seconds, the curd being then firm and good. The same milk, containing formic aldehyde to the extent of 1 in 10,000, or 0.01 per cent., gave clear evidence of the onset of curdling after the lapse of 20 seconds, and the action was complete in 40 seconds, a firm and satisfactory curd being produced. There was thus no difference in the effect of rennin on such milk as compared with pure milk; it was only when much stronger mixtures were used that any retardation in the curdling took place, and the curd was softer than usual. As in the preservation of milk for ordinary summer use an addition of the aldehyde to the extent of 1 in 30,000 or 40,000 is sufficient, it is clear that its presence in this minute amount would exercise no retarding effect on rennin action, since even with a 1 in 10,000 milk no delay is perceptible.

B. Effect on the Salivary Digestion of Starch.—To test

this, observations were made on the action of fresh saliva on a 1 per cent. solution of well-boiled starch, diluted to a definite amount with pure water for the control, and with solution of 1 in 25,000 formic aldehyde for the test. Using 1 c.cm. of the starch solution with 1 c.cm. of fresh saliva, and 5 c.cm. of either pure water or formalised water, it was noted that all the starch was inverted as rapidly in the one case as the other. For example, in one instance the control showed an absence of starch in 4 minutes, and the formalised solution in barely 4 minutes; in another instance the control gave no evidence of starch in $3\frac{3}{4}$ minutes, while the solution containing the formic aldehyde yielded exactly the same result. There was no evidence whatever that the activity of ptyalin was affected in the presence of 0.004 per cent. (1-25,000) of formic aldehyde, and no stronger solution would ever need to be used as a preservative.

C. Effect on Peptic Digestion.—Much has been written regarding the pernicious influence of formic aldehyde on gastric digestion, some ascribing it to the effect exerted on the ferments, others to the hardening of the proteid in the ingested food by the aldehyde. I cannot say that I have ever been able to satisfy myself as to this retarding influence, or seen any indication of it except perhaps on one occasion where it was extremely slight, and where there was some doubt as to the exactness of the procedure. In this instance an aqueous solution of formic aldehyde was used of the strength of 1 in 20,000 and a control of pure water. Of each of these, 10 c.cm. were placed in test-tubes, with 1 c.cm. of Benger's Liquor Pepticus and ten drops of 10 per cent. hydrochloric acid, and to each tube was added 0.5 grm. of carmine fibrin (such as is used in Grützner's digestion test), pressed free of moisture between layers of filter paper. The tubes were kept in the water bath at 40°, and examined every 5 minutes, each tube being shaken twice in the interval. The rate of digestion was gauged by the depth of colour imparted to the fluid by the liberated carmine. It certainly did appear to be slightly more marked in the control than in the formalised solution, but the difference was very small, and there was some doubt as to whether the moisture was equally well removed from the two portions of fibrin—a point which would affect the amount of

carmine present. Repeating the test with a solution of 1 in 30,000, each tube containing only 0.25 grm. of carmine fibrin, it was observed that as far as the eye could judge the tints were identical, and no evidence of retarding effect could be detected.

Varying the method, 100 c.cm. of a solution of 1-50,000 formic aldehyde were taken, to which were added 1 c.cm. of liquor pepsinæ and 3 c.cm. of 10 per cent. hydrochloric acid and 1 grm. of carmine fibrin. A control test with 100 c.cm. of pure water was also used. Both were kept at 38° C. with frequent stirring, and the activity of digestion was determined by the time required for complete solution of the fibrin. In 5 minutes a pink colour in each beaker indicated that digestion had commenced; in 8 minutes the fibrin was largely gone; in 10 minutes each liquid was equally red, and there was, if anything, rather more fibrin undigested in the control; at the end of 20 minutes the formalised solution was clear of fibrin, and in the control a very few minute flakes were still perceptible. There was thus no evidence of any retarding influence whatever; indeed, it might be said that digestion proceeded more rapidly where the formic aldehyde was present, but the small difference may be disregarded, being due, possibly, as in the first observation, to a slight difference in the weight of the fibrin curd.

The effect on digestion was also observed where the fibrin was first soaked in the formalised solution for some hours, previous to the use of the pepsin and acid. For example, equal weights of carmine fibrin were taken, and one portion was left in solution of formic aldehyde (1-50,000) for 8½ hours, while the control lay in pure water for the same period. Pepsin and acid were then added and the specimens were kept at 38° C. The fibrin was completely digested in each case in 30 minutes, and no difference could be detected between the digestibility of the fibrin subjected to the action of formic aldehyde, and of that not so treated. Experiments were also conducted on similar lines, where Mott's white of egg tubes were employed to test the rapidity of digestion, but the results obtained were not nearly so clear or so good as when carmine was used.

D. Effect of Formic Aldehyde on Pancreatic Digestion.—Various experiments were carried out to determine this point.

Of carmine-fibrin, 1 grm. was taken and left to soak in 100 c.cm. formic aldehyde solution of 1-50,000 for 8½ hours, a similar amount being left in pure water (same volume) for an identical period. There was then added to each, in a beaker, 1 c.cm. of strong glycerine extract of pancreas, and 1 grm. of anhydrous sodic carbonate, and the beakers were placed in the water bath at 38° C. A pink colour soon appeared, indicating that digestion had commenced, and the beakers were examined after the lapse of 5, 10, and 15 minutes. At the latter time the colours were the same, and digestion appeared to have proceeded equally in both, though the process was much slower than with pepsin. After the lapse of 25 minutes, 40 minutes, 50 minutes, and 65 minutes, the test beaker and the control gave similar results, a fair amount of fibrin, in a swollen and somewhat gelatinous condition, still remaining in each. There was no evidence of any retardation in the digestion of the formalised fibrin.

Repeating this, I obtained the same results; the fibrin was left in 1-50,000 formic aldehyde for 8½ hours, and then treated with pancreatic extract as described above; a control was also put up. Observations made after the lapse of 10, 20, 30, 40, and 100 minutes, gave similar results; after 6 hours and 40 minutes a little was still found undigested in each beaker, and there was, if anything, a little more left undigested in the formalised solution than in the control, indicating a slight retarding influence. By next day digestion was complete, and both were equal in tint. On another occasion the observations were made on carmine-fibrin treated for 3¾ hours in the formalised solution, sodic carbonate and pancreatic extract being added thereafter, as before, and the whole kept, along with the control, at 38° C. The solutions were observed every 10 minutes for a period of 100 minutes. For the first half-hour, the rate of digestion appeared equal in the two solutions, but after this the fibrin in pure water appeared to digest rather more rapidly than that which had been subjected to the aldehyde. The difference was not great, indeed it was very slight, yet it was appreciable. I think this was the only occasion on which retardation of digestion was observed in the formalised solution or material, and since it was not apparent in either of the two trials with fibrin that had been subjected

to the influence of formic aldehyde for 8½ hours, it seems susceptible of some other explanation. We may, I think, conclude that there is little to support the view that this preservative retards digestion, when present in such proportions as from 1 in 25,000 to 1 in 50,000.

5. *The Effect of Formic Aldehyde on Milk Analysis.*

The question might possibly be raised as to whether the presence of formic aldehyde in milk would interfere with the analysis of such milk. Would results be obtained unfavourable to the vendor or the reverse? It is known, for example, that this aldehyde can reduce Fehling's solution. Would its presence tend to make a milk appear richer in lactose than it really was? I made a number of analyses of pure milk, and of the same milk containing 1 in 25,000 formic aldehyde, estimating the proteids by Ritthausen's method, the fat by the Werner-Schmidt tube, and the lactose by Fehling's method (using the filtrate from the Ritthausen process for the titration), and I obtained results sometimes higher for the pure milk, sometimes for the formalised. The variations could all, I think, be covered by the experimental error; after all, the points in milk analysis that really matter are the total solids and the fat, and I doubt very greatly whether in 10 grms. of a milk (the amount that might be used for such analysis) containing, let us say, 1-20,000 of formic aldehyde, the actual quantity of 0.0005 grms. that is present could influence either the evaporation of water (for the total solids) or the extraction of the fat by ether (for the fatty solids). I incline to the opinion that such small amounts of the preservative exert no appreciable influence on the analysis of the samples containing them.

6. *The Influence of Formic Aldehyde in Milk on Metabolism.*

I have not yet had time to consider this matter as fully as I should like, and shall postpone any detailed mention of it for the present. In July 1901, Tunnicliffe and Rosenheim published some observations they had made (*Journal of Hygiene*), using

children as the subjects, and administering formic aldehyde in food in the strength of 1-9000 (fairly strong). They made observations on proteid and fat metabolism, on water retention, on body growth, etc. The experiments lasted twenty-eight days in each case, the first and last seven days respectively being fore- and after-periods, to allow of metabolic equilibrium being regained, while the preservative was given in the fortnight between. They selected three children, two being healthy boys, and one a delicate girl. They concluded that in healthy children, formic aldehyde in the strength mentioned causes a retention of water in the body, but exercises no appreciable effect on the metabolism of phosphorus or nitrogen, or on fat assimilation; in somewhat large doses it tended to diminish fat and phosphorus assimilation, possibly due to some effect on the pancreatic ferments. In a delicate subject they found that no retention of water in the body resulted, the nitrogen assimilation was little affected, there was an increased excretion of phosphorus, and fat assimilation was somewhat loosened. In all the cases the excretion of lecithin was diminished, no intestinal antiseptic effect could be discerned, and the general health remained constant. These observations indicate that there is really no effect of any importance caused by the use of food containing 1-9000 of formic aldehyde, or at least three times as much as would be employed for ordinary preservation of milk.

The question of the effect of very small amounts of the preservative on nutrition is one which I do not mean to discuss here, as it requires long-continued observation and experiment, and my own data are as yet too scanty to be of any real value. As far as they go, however, they do not point to any ill-effects from the use of milk containing, let us say, 1 in 30,000 of formic aldehyde. I think it is extremely improbable that when present in this small amount it could exercise any irritating or hurtful influence on the gastric or intestinal mucosa, for its chemical affinity is chiefly, if not entirely, for albuminous material, and the caseinogen of milk will more than satisfy, a feeble union probably taking place between the two, leaving none free to affect any mucous surface over which the food may pass. Observations made to determine whether any formic aldehyde present in milk was excreted

by the kidneys, gave either negative or extremely feeble positive results. For example, the bladder being empty and the subject fasting, 145 c.cm. of milk containing 1 in 30,000 of formic aldehyde was ingested at 11.15 A.M. At 1.15 P.M. urine was passed and tested as such for the preservative with negative results. At 3 P.M. the bladder was again emptied, and the sample again gave a negative result. These two samples, amounting to 200 c.cm. of urine, were then mixed and distilled, and 10 c.cm. of clear distillate obtained, which gave a very faint reaction with Jorissen's test. On another occasion, however, 150 c.cm. of milk with 1 in 25,000 of formic aldehyde having been taken, no trace of the latter could be found in the distillate obtained from 150 c.cm. of urine passed about three hours after the milk was swallowed. A normal urine on distillation gave no reaction with Jorissen's test.

The conviction that has been forced on my mind by the foregoing observations, and others of similar nature, is that we have judged this preservative somewhat over-severely. I am far from making the suggestion that preserved milk is as good as fresh, but as stated in the beginning of this paper, under existing circumstances, milk comes into town teeming with myriads of organisms, and in warm weather a great deal is lost. To obviate this, preservatives are constantly used in varying and often excessive amounts; would it not be better that the use of certain preservatives should be allowed, provided always that their nature and amount were clearly declared? If this were come to pass, I would urge a plea for reconsideration of the claims of formic aldehyde in such proportions as 1 in 30,000 and 1 in 40,000, believing that it might be possible to remove the ban under which it lies at present.

HYGIENIC AND INTELLECTUAL EDUCATION OF GIRLS[1]

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THE truth of fact being stranger than fiction is strongly borne out in the system of our education in the past, and even largely in the present day. It seems passing strange that it is only in this, the twentieth century, that we are beginning to wake up to and realise the necessity of carrying out education in its broader and wider sense. If education be the art of developing and cultivating the physical, intellectual, and moral faculties, a retrospect of the manner of carrying it out in the past in Great Britain shows how largely we have forgotten, and how much we have fallen behind, the teaching of Ancient Greece or Rome.

It must be candidly admitted that, until recent years, all that education has signified in this country is the feeding of the brains of pupils with intellectual food, with but little attention to hygiene and physical development, thereby ignoring the cardinal principle which demands a sound body as the prime factor in the attainment of high intellectual culture.

The State has assumed the great responsibility of training the individual, and, strange to say, the efforts of the legislation have hitherto been almost entirely directed to the intellectual side of the question, and with a view to compel the schoolmaster in a machine-like manner to work the brains of his pupils for results, as it is popularly called.

The few remarks I have the honour of addressing to this section, which by the rules of the Congress must be compressed into ten minutes, are devoted to a matter which has little engaged the attention of educationalists. I refer to the hygienic and intellectual education of our girls, and what I have to say is based on no theoretical ideas, but is the result of much thought and observation of the question from the standpoint of a

[1] Read before the Hygienic Congress of the Royal Institute of Public Health, London, July 1905.

physician of long experience. I make bold to say, in no egotistical spirit, that medical men are better qualified to form an opinion on the points in question than any other class of public servants. Being guardians of the public health, in an expert sense, they can speak with much authority. Strange to say, in framing the system and routine of our school arrangements they are rarely consulted, and it is only now that the public are realising the necessity of compelling our school authorities to base their system on sound hygienic principles.

Sir George Kekewich, late Secretary of the Board of Education, says, "There is nothing that the educational authorities need so badly as a medical adviser." "There is no doubt that such an officer could do much to stimulate the State to perform its duty to children."

The following observations bear more particularly on our large secondary day schools, and those especially in the large towns of Scotland which have come under my notice, but the principles may, no doubt, be held to apply all round in the training of girls in most of our large day schools. I am well aware that improved methods have already begun in some schools, but the principal object of my remarks is to enforce the necessity of universal reform in the system in all girls' schools.

The tendency, I had almost said the fashion, in the past and largely still at the present time, is to educate girls very much on the same lines as boys in regard to the scope and character of their school work. In laying down rules for the conduct of individuals in all the walks of life, regard is had to the requirements of the many more than the special needs of the few. In applying the principle to the education of boys, the practice well and truly carried out is to fit them by a liberal education for any future work which they may select. Boys have a large and varied choice of occupation in after life. What are the requirements of girls as compared with boys? The large majority of girls have only one occupation in their after life, that of becoming help-meets of man and the future mothers of our race, yet in educational matters the tendency, nay, I believe the practice largely obtains of educating them in secondary schools very much on the same lines as boys, ignoring altogether the sexual difference. This system is, in

my opinion, most detrimental to the health of girls, who are very hard and keen workers at school. The energy expended in the higher education renders them less able to bear the strain of duty in after-life, more especially with reference to the all-important function of maternity. Strange to say the evil effects of strain and waste of nerve energy do not, as a rule, show themselves during school life, but only become manifest at a later period. This is a fact which is largely borne out and proved by my own experience and that of other medical practitioners.

What, then, is the argument, and what the principles which should guide us, according to physiological laws, in training our girls? Special rules should be laid down for their education in accordance with the hygienic requirements of the sex. In order to carry this out, it is necessary to bear in mind physiological facts and the operation of natural laws as applicable to the sex. Puberty or the period of maturity in girls may be said to occur between the ages of 12 to 15, and this period is evidenced in them by many changes in the physical nature and mental constitution of the individual. The accession of puberty is the most physiologically important period of female life. Anything which interferes with, or is apt to disturb, the natural process of development at this time, is likely to affect the future health of women, the majority of whom are destined to become the mothers of our race. In our large day schools the education of our girls up to the age of 12 cannot be taken so much exception to, as at this period they are only engaged in the primary or elementary subjects and the hours are sufficiently short. About the age of 12, just when the girl is entering on the tender period of her life, the strain begins. From the age of 13 to 16, she enters on the full curriculum, and her mental powers are strained to the utmost, and it is at this time the harm is done, and the energy wasted which is needed and ought to be conserved for a later period of her life. To obviate this and avoid the risk of health, I hold that the period of study should not be extended and the full curriculum not entered on before the age of 16, when the physiological health of the girl is established. I am not one of those who would seek to negative the aspirations of the few girls who desire to embrace the

higher education with a view to the adoption of one or other of the higher walks of life, or the acquirement of University degrees, but let them delay the commencement of the higher studies till their health is fully matured about the age of 16, when the hard work is less likely to be injurious to health.

If my arguments be admitted as sound, it will be at once seen how necessary it is, instead of approximating the training of girls to the system adopted for boys, to lay down very special rules for their education. To my mind, the hygienic training of girls should be of primary, the intellectual of secondary importance. In this way their mental training would be conducted on such lines, and to such an extent, as in no way to impair or imperil their physical health.

Before concluding, I would refer to one other matter which is of prime importance in the education of girls, and which has been also overlooked by educational authorities. I refer to the need of instructing every girl before she leaves school in the ordinary laws of health. When we remember that the rearing of our children is the duty of women, the importance of this must be at once admitted. It is all very well for our school authorities to give attention to the physical as well as the intellectual training of our children in schools, but unless they are properly fed at home, and every care is taken to insure sanitation and a sound hygiene in the household, the exertions of school authorities must be, to a large extent, negatived. Hygiene must then begin at home, and unless our mothers are educated in these principles, we can never expect to attain satisfactory results in the physical improvement of the race of children they are called upon to rear.

Conclusions.

1. Education of girls to include home as well as school training. This can only be attained if the mothers in their girlhood have learned at school the elementary laws of health, which they will carry out during motherhood. To insure this, evening lectures or classes should be instituted for mothers, in connection with Board and other schools.

2. Hygienic training of girls should be considered of first mportance; intellectual training of secondary consequence,

and strictly regulated in accordance with the age and physical health of the pupils.

3. The *majority* of girls should not have more than three or four hours' intellectual work during each day, and for the whole period of school life. The *minority*, or those girls who aspire to the higher education, should not commence such studies before the age of 16 at soonest.

4. All girls should be instructed during the last year of their school curriculum in elementary physiology and hygiene, in order that when they become wives and mothers they may have an intelligent appreciation of the proper principles necessary for the rearing of healthy children.

THE BACTERIOLOGY OF AURAL AND NASAL DISCHARGES IN SCARLET FEVER AND OTHER DISEASES

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IN the course of a research into the micro-organisms associated with inflammatory diseases of the upper respiratory tract, it appeared that an examination of the discharges from the nasal chambers and ears in scarlet fever and other infective diseases formed an important branch of the subject, and might possibly yield fruitful results. For the provision of material for this investigation, I am indebted to the kindness of Dr C. B. Ker, Superintendent of the Edinburgh City Hospital. Also I desire to acknowledge with gratitude the help accorded by Drs Prichard and Monnington, Resident Physicians to the Hospital, in taking swabs for me from the various cases. The research may be most briefly set forth by first describing the methods employed. These did not differ materially throughout the investigation. Thereafter the results will be stated in regard to individual diseases and some general conclusions may be formulated from these results.

Methods.—Specimens of the discharges were obtained by means of sterile swabs. The specimens were collected with careful precautions, so as to obviate, as far as possible, contamination by contact of the swabs with anything but the discharge. Particularly was this the case in rhinorrhea, where hairs and crusts in the vestibule need to be avoided, though it was not always easy to obtain the specimen from the interior of the nasal cavity of young children. On receipt of the swabs at the laboratory it was sometimes possible to prepare direct films and, on staining these, to determine approximately the various kinds of organisms present. But much more than this was necessary to disclose the particular organisms in each case, and cultivations on artificial media were always made. The swab was rubbed over the surface of blood-serum or agar in tube and the medium was incubated at 37° C. The swab itself was then immersed in sterile broth and also incubated at 37° C. Next day the cultures on solid media were examined and the broth plated out. The plating out of the broth was required, as it seldom contained only one variety of organism. The plates were made of serum-agar, of agar, or of jelly, and it may be noted that the serum should not be omitted in a thorough investigation, owing to the frequent presence of the pneumococcus in the discharges. It is difficult to isolate this organism if serum be absent from the media. Consequently I found the serum-agar plate the most satisfactory medium; it best reveals the pneumococcus and diphtheria bacilli in impure cultures. The serum-agar plate may be made in two ways: either (1) by adding serum, such as hydrocele or ascitic fluid, to the melted agar just before pouring the plate; or (2) by spreading the serum over the surface of the cold agar after it has solidified in the plate. The former is the better method. The impure broth culture which is being plated out may be spread over the surface of the plate with a platinum spreader. This gives only superficial colonies in the plate, and from these pure sub-cultures may easily be obtained. The original broth in which the swab has been immersed for eighteen to twenty-four hours at 37° C. may be used for spreading the plate, but as the growth in this broth culture is frequently too copious, it is well to use instead either (1) a dilution, in sterile broth or water, of this original broth, or (2) a sub-culture of this original broth

prepared by inoculating a fresh broth tube and incubating it at 37° C. for one hour.

In each case submitted to examination the organisms present were isolated by this method in pure culture and their characters determined by staining and by sub-cultures on various media. In many cases the pathogenicity of the organisms thus isolated was tested on animals, such as the rabbit and guinea-pig.

Scarlet Fever—Otitis media suppurativa. — There were forty-six cases of this nature from which swabs were taken. It was quite exceptional to obtain a pure culture or to find present only one organism to which the condition could conceivably be due. In only three of the cases were the cultures practically pure, and each of these exhibited a different organism. In one case, in which the swab was taken at the very commencement of the discharge (on the first day of discharge and very early after its discovery), the only pyogenic organism present was the pneumococcus. Sarcina flava also appeared in the plate but nothing else, and it may have been a contamination from the air. In the second case the only organism present was a diphtheroid bacillus, which was non-pathogenic to a guinea-pig, but otherwise much resembled true B. diphtheriæ. In the third case the streptococcus pyogenes was present with only sarcina flava as a companion. Of the other forty-three cases, ten showed two varieties of organism, twenty-four showed three, eight showed four, and one case showed five varieties present. There are four great groups of organisms which far exceed in frequency of incidence all others. These are the pneumococci, the staphylococci, the streptococci, and the diphtheroid bacilli. Every case shows one or more of these four groups. The three former need no exposition ; but in regard to the diphtheroid bacilli, it is advisable to explain that included in this term are the true B. diphtheriæ (Klebs-Löffler), the pseudo-diphtheria bacillus, and the bacillus of Hofmann. The bacillus of Hofmann does not produce acid in glucose broth, but most of the other members of this group of bacilli have this power. Of the forty-six cases, thirty showed staphylococci, thirty showed diphtheroid bacilli, twenty-nine showed streptococci, and twenty-six showed pneumococci.

Other organisms occasionally met with were the bacillus mesentericus, proteus vulgaris, bacillus coli communis, and sarcina. The bacillus of Hofmann was present in twelve cases, and in five of these it was the only bacillus of its group present; in the other seven it was accompanied by diphtheria or pseudo-diphtheria bacilli. Thus there were twenty-five cases showing diphtheroid bacilli, other than B. Hofmann, and the great majority of these organisms produced acid when cultivated in glucose broth. In only four of these twenty-five cases were there organisms present which morphologically resembled diphtheria bacilli, but which failed to produce acid in glucose broth cultures. The most common bacilli were those akin to B. diphtheriæ (Klebs-Löffler) in morphology and in acid production, but differing from it in pathogenicity to guinea-pigs and in typical reaction to Neisser's staining method. These bacilli, isolated from ten cases, were injected into guinea-pigs but without any pathogenic effect.

The pathogenicity of the pneumococci was tested in nineteen of the twenty-six cases in which their presence was ascertained. The organisms were virulent in five, or a pathogenicity of 26 per cent. The streptococci, similarly investigated in eighteen cases, proved pathogenic in eight. This gives a pathogenicity of 47 per cent. The staphylococci were tested in sixteen of the thirty cases and proved pathogenic in four, a pathogenicity of 25 per cent. In analysing the results of the experimental injections of cultures of these organisms, it was noticed that when the swab had been taken near the onset of the discharge the organisms possessed greater virulence. Limiting our consideration only to those cases in which the swabs were obtained within a week of the commencement of discharge, it appeared that the pathogenicity of the pneumococci, staphylococci, and streptococci was respectively 55, 50, and 77 per cent. That is to say, that during the first week of discharge the pus contains virulent organisms, and in later weeks the organisms are seldom sufficiently virulent to produce illness in the animals tested. Of the seventeen pathogenic cultures referred to above, fifteen were obtained from cases in which the discharge had lasted less than a week and two from cases in which the discharge had lasted from one to two weeks. In cases of longer duration than a

fortnight, none of the organisms tested proved virulent to animals.

Scarlet Fever—Rhinitis.—There were twenty-six cases of this nature from which swabs were taken. In only four of these was the discharge mono-organismal. The organisms present in these four cases were the streptococcus conglomeratus, the streptococcus pyogenes longus, and the staphylococcus pyogenes aureus (twice) respectively. The other twenty-two cases showed various combinations of organisms, there being two varieties present in ten cases, three varieties in ten cases, and four varieties in two cases. The organisms present included many different kinds. The pneumococcus was present in six of the twenty-six cases, staphylococci in seventeen cases, and streptococci in eighteen cases. Diphtheroid bacilli were present in fifteen cases. In seven of these the particular organism proved to be the bacillus of Hofmann, and in seven the pseudo-diphtheria bacillus; while in one case both of these were present. Other organisms occasionally isolated from these cases of scarlet fever rhinitis included the bacillus mesentericus and proteus vulgaris. In two of the cases the pus contained neither streptococci nor staphylococci, but only the pneumococcus and the bacillus of Hofmann in combination.

The pathogenicity of the organisms present in rhinitis resembles fairly closely that of those met with in otitis media. Thus the pneumococci showed virulence in 25 per cent., the streptococci in 44 per cent., and the staphylococci in 33 per cent. of the cases tested. Further, it was in the first week of discharge that most of the pathogenic varieties were met with, and the percentage pathogenicity at this stage amounted to 50, 75, and 60 per cent. for the pneumococci, streptococci, and staphylococci respectively. While the pneumococci and staphylococci were not recovered in a virulent state when the discharge had lasted longer than a week, the streptococci were sometimes virulent at later periods. Pathogenic streptococci were isolated during the second and third weeks of discharge, and in one case even after the discharge had persisted for more than one month. This contrasts somewhat forcibly with the absence of pathogenicity in the specimens from the ear discharges of similar duration.

Whooping-Cough—Rhinitis.—In four cases of whooping-cough there was a discharge from the nasal chambers which was examined bacteriologically. The pus in each case contained staphylococci, and in no case contained streptococci. In two of the cases pure cultures of staphylococci were the only organisms isolated from the pus. In one of these the staphylococcus pyogenes aureus and in the other the staphylococcus pyogenes citreus was present. Both these staphylococci were non-pathogenic on injection into guinea-pigs. The pneumococcus was found in two cases and a diphtheroid bacillus in one case. This bacillus did not stain by Neisser's method and was non-pathogenic to a guinea-pig, but produced acid on cultivation in glucose broth. In all four cases of whooping-cough the rhinitis was of short duration. The discharge had lasted in one case less than a week and in the other three cases under a fortnight.

Diphtheria—Otitis media.—Five cases of otitis following diphtheria were examined, and in four of these the discharge had only lasted from three to ten days. In no case was the pus mono-microbic, and usually it contained two or three kinds of organisms. The pneumococcus was present in three cases, staphylococci and streptococci in two each, and diphtheroid bacilli in all cases. These bacilli did not stain by Neisser's method. One case showed the bacillus of Hofmann, and two cases exhibited diphtheroid bacilli which produced acid in glucose broth. In three cases there was present a bacillus morphologically diphtheroid, but incapable of producing acid in glucose broth. This organism on agar plates grows as a dark smear or dark grey-green colonies, which × 105 show a granular substance with dark nuclei scattered throughout it. The organisms, × 800 in hanging drop, appear as long, non-motile rods, often at an angle with each other. These rods stain irregularly with Löffler's blue stain and appear barred and segmented. They are stained positively by Gram's method, but do not stain by Neisser's method. The bacillus mycoides was present in one case.

Diphtheria—Rhinitis.—Six cases of rhinitis following diphtheria were examined. Staphylococci were present in

five, streptococci in three, and the pneumococcus in one case. Bacilli of the diphtheria group were present in all cases. These diphtheroid bacilli included a virulent B. diptheriæ (Klebs-Löffler) in one case, while in three cases the bacilli were non-pathogenic and negative to Neisser's stain, but capable of producing acid in glucose broth. The bacillus of Hofmann was present in three cases, and bacillus mesentericus in two cases. No case was mono-organismal, and there were seldom less than three varieties of organisms in the pus.

Measles—Otitis media.—Five cases of otorrhea complicating measles were examined, four of these within two to five days from the commencement of the discharge. In the fifth case the duration of discharge had been between two and three weeks. This latter case should perhaps be excluded, as in reality it was scarlatinal otitis, the measles attack having followed scarlet fever. The streptococcus pyogenes was present along with sarcina flava, and the streptococcus was pathogenic to a guinea-pig. The other four cases, all recent in origin, and all in children ranging from two to five years of age, showed no streptococci, but all yielded staphylococci. In one of the cases, which had only lasted two days, the pus contained staphylococcus pyogenes aureus and albus. The former proved fatal to a guinea-pig in three days after the subcutaneous injection of 2 c.c. of broth culture, and was recovered from the pus of an abscess at the site of injection in the flank. It was not recovered from the heart blood, but there was serous effusion in the pleura and peritoneum, and the blood was fluid or semi-fluid. The staphylococcus albus also proved fatal to a guinea-pig, but only after twelve days, and the organism was recovered from the heart blood. In the second case the pus yielded a non-pathogenic staphylococcus pyogenes aureus and the bacillus mycoides. In the third case the pus contained the pneumococcus and the bacillus of Hofmann in addition to the staphylococcus pyogenes aureus. In the fourth case the organisms present were the staphylococcus pyogenes albus and a bacillus, diphtheroid in morphological character but incapable of producing acid in glucose broth.

Measles—Rhinitis—Five cases of rhinitis following measles

were examined bacteriologically. The pus from one of these cases, which had lasted a fortnight, gave a pure culture of the pneumococcus, but the pus in the other four cases was polymicrobic. Of the five cases the pneumococcus was present in four, staphylococci in three, streptococci in two, and the bacillus of Hofmann in two. Diphtheroid bacilli, other than the bacillus of Hofmann, were present in two cases accompanied by that organism, and in one case without it. These bacilli were all negative to reaction with Neisser's stain, but produced acid in glucose broth. The pathogenicity of the organisms present in these cases of measles rhinitis was not tested. The duration of the discharge in the five cases varied from one week to one month.

Otitis media not associated with an Acute Infectious Disease.—Swabs were obtained from three cases of otitis media occurring independently of infectious disease. These were utilised for comparative purposes, and exhibited organisms of similar kinds to those already noted in cases following infectious diseases. Staphylococci were present in all three cases, streptococci in two, the bacillus mesentericus in two, while proteus vulgaris and a diphtheroid bacillus were found in one case. The pus was derived in one case from an acute suppurative otitis occurring in a child aged three years. The organisms present were the staphylococci aureus and albus, the streptococcus pyogenes and the bacillus mesentericus. Notwithstanding the acute nature of the illness, none of these organisms proved pathogenic on injection into guinea-pigs.

Mastoid Abscess.—In six cases of mastoid abscess, pneumococci were present in five, streptococci in five, and staphylococci in three. With the exception of one streptococcus, all these were tested as to virulence in culture, but none were found pathogenic to animals.

Frontal Mucocele.—In one case of suppurating frontal mucocele both staphylococci and streptococci were present. At the time of operation the pus contained streptococcus pyogenes and the staphylococci aureus and citreus. Ten days later a swab from the discharge on the dressing contained the

streptococcus pyogenes and the staphylococcus albus. The streptococcus after isolation in pure culture was not pathogenic to a guinea-pig.

General Conclusions.—From the examination of the aural and nasal discharges in these 107 cases of varied origin, the following conclusions appear justifiable:—

1. Purulent discharges of aural and nasal derivation exhibit a variety of bacteria, and do not depend upon a single micro-organism common to all cases.

2. There are four main groups of organisms which exceed all others in frequency of occurrence in such discharges, viz. pneumococci, streptococci, staphylococci, and bacilli of the diphtheria group. These, however, do not comprise all the varieties which the pus may contain.

3. Pure cultures from these discharges are the exception rather than the rule, yet they occasionally occur, and may be met with in about ten per cent. of the cases.

4. While the discharges are not usually mono-microbic, and do not always contain the same organisms in particular diseases, nevertheless the bacterial contents of such discharges associated with individual diseases present distinctive differences. For example, in this series of cases the aural and nasal discharges in diphtheria always contained bacilli of the diphtheria group, the nasal discharges of whooping-cough always contained staphylococci, and the aural discharges of measles likewise always contained staphylococci. The absence of streptococci in the rhinitis of whooping-cough, and in the otitis of measles, may be accidental, but is certainly suggestive in contrast to their prevalence in the otitis and rhinitis of scarlet fever. In the pus from a mastoid abscess, pneumococci and streptococci are more common than staphylococci.

5. In scarlet fever, aural suppuration is not always due to the same organism. Either the pneumococcus, the streptococcus pyogenes or a bacillus of the diphtheria group may be responsible, and, having regard to the frequent presence of staphylococci in such pus, there is no reason to doubt that cases occur in which a staphylococcus is similarly responsible, though, as it happened, no case in this series showed a pure culture of a staphylococcus.

6. In scarlet fever, nasal suppuration may be of streptococcal, staphylococcal, or pneumococcal origin. Probably it may sometimes be due to bacilli of the diphtheria group.

7. In scarlet fever the pneumococcus is present in otitis much more frequently than in rhinitis. It occurred in 56.5 per cent. of the former, and only in 23 per cent. of the latter cases.

8. In scarlet fever the organisms present in aural and nasal discharges are less virulent in the later than in the earlier stages of the suppuration.

9. In the rhinitis of scarlet fever, streptococci may retain their pathogenicity even when the discharge has lasted for more than a month.

10. If the infectivity of post-scarlatinal discharges bears any relation to their source and duration or depends upon the pathogenicity of the organisms present, these observations suggest that otitis and rhinitis are equally dangerous in their early stages, but that the nasal discharge is more likely to contain virulent streptococci in its later stages. Perhaps one may go further and suggest that rhinitis may be the most fruitful source of consecutive and "return" cases. I am not aware whether this indictment of rhinitis coincides with the general experience of hospital physicians, but some confirmation of it is afforded by the opinion expressed by Dr Pugh in a recent address on the infectivity of scarlet fever.

11. The frequency with which bacilli of the diphtheria group are present in the aural and nasal discharges of scarlet fever is very notable. It suggests that scarlet fever and diphtheria may bear a closer relationship than is commonly assigned to them. The epidemiology of these diseases in particular localities requires, and would probably repay, more thorough comparative study.

PROFESSOR VON BEHRING'S NEW REMEDY FOR TUBERCULOSIS

THE following is the text of Professor von Behring's communication to the International Congress on Tuberculosis, 7th October 1905, kindly supplied to us by Dr Leslie Mackenzie:—

"In the course of the last two years I have come to recognise with certainty the existence of a curative principle entirely different from the anti-toxic principle described by me fifteen years ago.

"This newly discovered curative principle plays the essential part in the immunising action of my 'bovo-vaccin,' which in the last four years has, in the hands of practical farmers, given evidence of its efficacy in the struggle against bovine tuberculosis.

"The new principle depends on the impregnation of the living cells of the organism by a substance derived from the virus of tuberculosis and I have named it 'TC.'

"When the substance 'TC' has become an integral part of the cells of the organism of animals treated with it, and when it has undergone metamorphosis by those cells, I designate it by the formula TX.

"In the bacillus of tuberculosis, the substance TX, or more properly TC, pre-exists as an agent endowed with a large number of extraordinary qualities. This agent fulfils, in the tubercle bacillus, the function of a 'formative' substance. Further, it possesses fermentative and particularly catalytic qualities. By contact it can fix, in an elective way, on other substances—a phenomenon that has been named 'adsorption.' In certain conditions it possesses assimilative qualities. In a word it represents the 'quasi-vital principle' of the bacilli.

"In my process for the immunisation of bovines against tuberculosis the substance TC of the bacilli is freed from other substances; it exercises a symbiotic action in the interior of the organic cells, particularly in the cellular elements derived from the germinative centres of lymph tissue. The presence of the substance TC is, on the one hand, the cause of the hypersensibility to the tuberculine of Koch, and is, on the other hand, the cause of the protective re-action against tuberculosis.

"It is by a long road that, after conquering many difficulties, I have arrived at this conception of the method of producing immunity against tuberculosis. At this conception of 'cellular' immunity, which is entirely different from 'humoral' (anti-toxic) immunity, I should, I must say, not have arrived but for a very intimate knowledge of Metchnikoff's researches on phagocytosis.

"If I wished to put before you in detail the conclusive proofs of the correctness of my conception, I should be obliged to detain you for many hours. I have expounded a part of the proof in the first section of a book, which will be entitled, 'Modern Problems in Phthisio-genesis and Phthisio-therapeutics.' Some passages of this first section have just appeared in *Tuberculosis* for September 1905. I wish here to attempt merely to describe the nature and the mode of action of the new therapeutic method arising out of my scientific studies on tuberculosis.

"This new method is, I believe, calculated to protect men threatened with phthisis against the injurious consequences of tubercular infection. I consider it a great honour to be able, at a general meeting of the Paris Congress, to make a short communication on 'a means of combating tuberculosis by a new remedy.'

"I assume that my method of vaccinating bovines against tuberculosis is known. Without my needing to insist, it will readily be granted that I have considered all the possibilities of applying this procedure in the combat against human tuberculosis. But, from my experience, I have been clearly led to decline once for all to introduce living tubercle bacilli into the human body for a therapeutic purpose. Accordingly, for me the anti-tubercular treatment of man begins with the discovery of the remedy I am going to speak of. After the above sketch of the method of immunisation against tuberculosis, it will be understood, without further details, that I have endeavoured unweariedly to save the organism from the labour, always long and dangerous, of elaborating the substance TC. I have arrived at the same end by experiments outside the body (*in vitro*). I have converted active immunisation, as Ehrlich says, into a passive immunisation.

"I can assure you that rarely in my life have I felt happier than during the days, the weeks, and the months when the causal link that binds vaccination to immunity appeared to me with a clearness steadily increasing, thanks to the observation of innumerable experiments on animals. One enigma after another in the nature and action of the anti-diphtheritic serum was explained.

"To condense into a few words the results of my work, I shall say that to free the substance TC from the substances that hinder its therapeutic action it is well to distinguish three groups of bacillary substances:—

"(1) A substance soluble only in pure water, and having a fermentative and catalytic action. From this substance soluble in water are derived the toxic elements in the tuberculine of

Koch. The substance has all the chromophil, physical, and chemical qualities of the 'volutine' described by our Marburg botanist, Arthur Meyer. I name this substance TV.

"To give an idea of the toxic power of TV, I may say that a gramme (about 15 grains) of this substance in the dry state is more powerful than a litre (nearly 2 pints) of Koch's tuberculine.

"(2) A globulin substance, soluble only in a neutral salt solution, for example a 10 per cent. solution of sodium chloride. This substance I have named TGL. It also is toxic in the same way as Koch's tuberculine.

"(3) Several non-toxic substances, soluble only in alcohol, ether, chloroform, etc.

"Once the tubercle bacillus has been freed from these three groups of substances, there remains in it a body that I designate 'restbacillus.' This 'restbacillus' retains the same form and staining qualities as the tubercle bacillus itself. By suitable methods of preparation it can be modified in such a way that it becomes an amorphous substance, capable of direct absorption by the lymphatic cells of the guinea-pig, the rabbit, the sheep, the goat, bovines, and horses. The amorphous substance is elaborated and metamorphosed by the lymphatic cells of the different animals, and these cells become oxyphil and eosinophil. As the metamorphosis of the cells under the influence of the substance TC proceeds, the state of immunity in the organism is evolved.

"A fundamental fact is that the substance TC, though non-reproductive, possesses nevertheless the power of giving rise to a tubercular nodule (*tubercule*). The nodule thus produced does not caseate and never softens. It corresponds exactly to the 'tubercular granulation' of Lænnec. In certain conditions the substance TC may also cause the 'grey infiltration' and the 'gelatiniform infiltration' of Lænnec.

"By experiments on different mammals I have been able to convince myself that the substance TC, pre-existing, as I have said, in the tubercle bacillus, can be elaborated outside the body (*in vitro*) in such a way that it can be used without danger as a remedy in human tuberculosis. The therapeutic part of my book, which should appear next year, will not see the light until the therapeutic efficacy and harmlessness of my remedy shall have been demonstrated by clinicians of greater experience than myself in the study of the individual varieties of pulmonary phthisis and its prognosis.

"On the other hand, it seems to me necessary that other investigators, working in other laboratories, should test the therapeutic action of my remedy on animals and confirm the fact that, up to this day, there is no known agent of equal therapeutic value.

"You know that, up to the present time, the tuberculine of Koch and his new tuberculine (TR), the serum of Maragliano, the serum of Marmorek, and several other preparations declared to be specific, had, according to their inventors, preventive or curative effects; but you also know that in many subsequent observations, especially on the guinea-pig, such good results were not obtained. I hope to be more fortunate, and I hope that those investigators to whom, after my return to Marburg, I shall confide my remedy that they may experiment with it, will obtain, in their laboratories, therapeutic results as good as my own or even better.

"I beg of you not to forget that my communication of to-day recalls in a special way that which I made in 1890 'on a new remedy for diphtheria.' My conviction of the capital importance of that discovery has, in the course of the last fifteen years, been confirmed in a striking way all over the world. But after my communication, not less than four years elapsed before those in practice trusted the remedy. Perhaps I should have had to wait a still longer time for the recognition of the accuracy and importance of my scientific statements, if my great friend Emile Roux had not risen at Budapest to fight with me the battle against diphtheria, 'the slayer of children.'

"How much time will yet elapse before the discovery and use of my new remedy for tuberculosis receives the public recognition that the confirmation of its practical value will give it, I do not know. Many factors may intervene,—my joy in the work and my activity, my skill as a tactician, and also my good fortune. May it give me in the fight a companion of the quality of Roux, with the same conquering power and the same disinterestedness free from every shade of suspicion! And then I hope that the next Congress on Tuberculosis will be able to record considerable progress in the struggle against phthisis in the human being."

Meetings of Societies

The Glasgow Medico-Chirurgical Society

THE first meeting of session 1905-1906 was held on October 6—the President, Dr Lindsay Steven, in the chair. There was a large attendance, and Dr Steven delivered his inaugural address entitled "Morgagni to Virchow: an Epoch in the History of Medicine."

Some had regarded the study of the history of medicine

as a melancholy task, the failures and mistakes being so many. But were there not many successes in which we should rejoice, and ought not mistakes to claim sympathy? As mile-stones on the road of progress there were numerous epochs, great periods of change and advance, and following Sprengel's classification, the following might be named in the Christian era:—

1. The epoch of Galen (131-200 A.D.). It was not too much to say that the influence of Galen was greater than that of Hippocrates. It dominated medicine for thirteen centuries, and particularly attracted the Mohammedan mind; owing to its authority, however, it kept men from Nature. This was the period of Græco-Arabian supremacy.

2. An epoch short in time, but of considerable importance, was that of Mundinus (1275-1326), who revived the study of anatomy by means of fresh dissections, a practice at that time opposed to the tenets of Christian and Musselman religion alike. His book was published in 1316.

3. A hundred and fifty years later came Vesalius, the distinguished professor of Padua, who finally discarded the authority of Galen and overthrew the Græco-Arabian supremacy. From this epoch may really be dated the revival of medicine, and this epoch is one of the brightest in the history of our art.

4. William Harvey's discovery was so momentous that it may fittingly be placed in an epoch of its own. Born in 1578 and a student at Padua in 1599, it was not till 1628, when he was fifty, that his book "De Motû Cordis" was given to the world. The truth of his observations was confirmed in 1661 by Malpighi, who demonstrated the actual circulation in the frog.

5. This brings us to the great epoch with which we are specially concerned—the period of medical history extending from the time of Morgagni (1682-1771) to that of Virchow. Morgagni's great achievement was that by his famous work on the nature and causation of disease—a work actually not published till 1761, when he was 79 years of age—he placed medicine on a scientific basis. Great men of that time, like Sydenham, did splendid clinical work, but based their views of pathology on the most absurd humoral and other theories. The value of Morgagni's work was that he sought to correlate symptoms with post-mortem phenomena, and thus obtain a rational explanation of the former. He obtained great recognition of his labours, and received many honours from learned societies in London, Berlin, Paris, and St Petersburg. He put an end to the metaphysical medical systems of the eighteenth century. Close upon him followed a great galaxy of brilliant men. Among his contemporaries were Cullen, the Hunters, and

Anenbrugger, who introduced percussion; while after them followed, in France, Bichât, the brilliant young histologist; Lænnec, who gave us the stethoscope; and Cruveilhier; in England, Baillie the pathologist, Richard Bright, and Addison; and in Germany, Schleiden, Schwann, and last of all Virchow, who, by the publication of his "Cellular Pathology" in 1858, put a fitting coping-stone on the structure whose foundations were laid by Morgagni.

On the motion of Dr Reid, seconded by Dr W. G. Dun, a very hearty vote of thanks was accorded to Dr Steven for his excellent address.

Glasgow Pathological and Clinical Society

THE first meeting of session 1905-1906 was held on October 9—the President, Professor Robert Muir, in the chair. There was a good attendance.

As fresh specimens there were shown:—(1) For Dr Adams, a large myoma of the cervix uteri and a sub-mucous fibroid of the posterior wall. (2) For Dr J. S. M'Kendrick, a large heart with atheroma of aorta, and complete obliteration of the pericardial sac, while portions of the chest were filled with cheesy masses undergoing calcareous change.

(3) Dr A. N. Macgregor showed a baby from whom he had removed a large teratoma of the neck. The infant, a female, was admitted to the Royal Infirmary when 15 days old, with a large congenital tumour, the size of a clenched fist, on the left side of the neck. It extended from the clavicle to the cheek, affected respiration but not deglutition, and was somewhat fluctuant. Nine days later, operation was performed, and the mass, partly solid, partly cystic, removed. There were attachments to thyroid cartilage and muscle, and to the hyoid. The space was drained, and the child recovered well, the skin of the neck being much wrinkled. Dr Workman reported on the pathological characters of the mass, which he said was partly cystic, partly solid. The latter was very vascular, and showed a structure on section like a round-celled sarcoma. In other parts there was cartilage, and in others congeries of small cysts, filled with blood, débris, or clear fluid. There were also tubular spaces lined with epithelium. It was probable that the origin was a branchial arch. The case was discussed by Mr Henry Clark, Drs Lindsay Steven and Edington, and the President.

(4) Dr Walker Downie showed two cases of branchial

fistula which had been exhibited to the Society on March 13 last, and on which he had operated with success. In the one case (male), the fistula had external and internal openings, and extended from the right tonsil down to above the sterno-clavicular joint. In the other case (female), the opening was internal only. The operation was carried out by making an incision along the anterior margin of the sterno-mastoid, and dissecting out and freeing the tube as far as possible. A probe was then passed in, its eye tied to the lower end of the tube, and, by pulling the probe out by way of the mouth, the tube was invaginated, and could be thus entirely removed. Most difficulty was experienced in the man's case. The tube was found to be made up of lymphoid tissue, but in the male subject the lining was columnar ciliated epithelium, while in the female it was stratified.

(5) Mr Henry Clark showed a large kidney removed from a man for calculous pyelitis, and chiefly remarkable for the large size which it had been allowed to attain before operation was attempted. The patient had been ill for some nine months, had had gonorrhœa and syphilis, and had been in India. On admission to hospital a large tumour was visible, and palpable in the left lumbar region, and the urine was septic, devoid of tubercle bacilli, and with much pus. The operation was done in two stages, the first being to allow the pus to drain away, and at the first evacuation fully a pint of very septic matter was got out. Three days later the kidney was removed, there being firm adhesions to diaphragm and peritoneum. Mr Clark also showed a cast and photograph of the hand of a girl with multiple digits, which had the appearance of two additional thumbs grafted on to the ordinary one. These two were removed.

(6) Dr R. T. Wells, introduced by Dr Lindsay Steven, exhibited excellent films of malaria parasite (tertian), prepared with the Romanowsky stain from a case of quotidian ague in the Royal Infirmary.

Glasgow Southern Medical Society

THE first meeting of the sixty-first session of the Society was held on October 5—the President, Professor R. Stockman, in the chair. There was a large attendance, and the President delivered an inaugural address on "Heredity in Disease," with special reference to practical medicine. This subject, said Dr Stockman, along with the allied one, the origin of species,

had proved a great fascination to the human mind, and still remained largely a great mystery. Referring first to Lamarck's work, he pointed out that he was really the first, nearly a century ago, to formulate a definite theory of the origin of species; he attributed the changes produced largely to outside influences, and to use and disuse of parts, and believed that the new characters thus acquired were transmitted, and a new species arose. This theory fails to explain such things as mimicry and protective colouring. Darwin, on the other hand (1858), found the motive from within: he held that there was a tendency to variations; that by natural selection those species with useful variations persisted, surviving in the struggle for existence, and so new species were evolved. He held that acquired characters could be transmitted. A short sketch was then given of fertilization, the essential point in which consisted of the blending of two cells—sperm and ovum, and from this new nucleus there arose the mass of sub-divided cells that ultimately form the mature organism. This was composed, broadly speaking, of (*a*) body-cells and (*b*) germ-cells, which remained undifferentiated and could reproduce. Jäger introduced the term "continuity of germ-plasm," and the idea was elaborated by Weismann, who holds that it is eternal, passed on from generation to generation, yet with an innate tendency to produce unlikenesses, on which the chance of improvement rests. Variations must be of one or other of two kinds—either inborn, or acquired from outside influences impressing the germ-plasm. Darwin in his doctrine of pangenesis held that the body-cells gave off gemmules which entered into the substance of the germ-cells, and this explained heredity, the acquired character being transmitted. Weismann denying this, holds that tendency to variation is inborn, but admits the germ-plasm may be affected along with the body-cells by external influences, *e.g.* climate, or poisons such as alcohol.

A distinction must be drawn between "congenital" and "hereditary" as applied to disease, the former merely indicating the time of affection. Some diseases, or rather abnormal conditions, are certainly transmissible, and are never acquired, such as hæmophilia, polydactylism, and hypospadias. Most physicians and many pathologists did believe in the inheritance of acquired characters, but the evidence for this was hardly satisfactory. Turning lastly to the more direct issue of heredity in disease, Dr Stockman said that it must be borne in mind that the great majority of all ailments was due to infective agents or to some form of toxin. Heart disease, for example, was rarely an idiopathic affection; it was simply a scar left after the infection of rheumatism, scarlatina, gonorrhœa, or

septicæmia. Considering, then, that organisms played so large a part in disease processes, we might do one of three things with regard to them: (1) we might kill them off entirely, and (2) we might avoid them and escape infection. These two methods were carried out by Nature. Or in the third place, we might undergo evolution and become resistant to the disease. This was possible where a disease, like scarlet fever, protected by one attack. The strongest survived, and this resisting power was transmitted, being inborn, not acquired. In tubercle, on the other hand, no protection was gained (rather the reverse), and no resisting power could be handed on. In conclusion, Dr Stockman illustrated this theory by various other diseases. On the motion of Dr Napier, a very hearty vote of thanks was accorded the President for his address.

Forfarshire Medical Association

ON Thursday afternoon, October 6th, Dr Sinclair, the President, introduced to a large attendance of members of the Forfarshire Medical Association, Professor A. R. Simpson, who had kindly consented to deliver an inaugural address for the ensuing session. He mentioned that the occasion was unique, in that it was the first public appearance of Professor Simpson since he gave to the world that classical oration on his retirement from the Chair he had occupied with so much distinction. Professor Simpson's address, dealing with the subject of Criminal Abortion, will appear in next month's *Journal*.

Obituary

Dr Alexander Black

THE death from pneumonia, on 13th October, of Dr Alexander Black, came as a shock and surprise to most of his friends; for, although he had been known to be in feeble health for some months past, a fatal result was not anticipated.

Dr Black was the third son of the late Mr Alexander Black, Writer and Procurator-Fiscal in Cupar, and he was born there in 1855. He was educated at the Madras Academy, Cupar, and at St Andrews University, but he pursued his medical studies at Edinburgh, where he graduated M.B., C.M. in 1877. He subsequently became a Fellow of the Royal College of Physicians, Edinburgh. After his graduation Dr Black acted

for a year as a Resident in the Royal Infirmary under Mr John Duncan and Dr G. W. Balfour. He then spent a winter at the medical schools of Berlin, Prague, and Vienna. Returning to Edinburgh, Dr Black commenced practice in the northern district of the city, where he soon acquired a good position as a practitioner. He held for a time the appointments of medical officer of the Royal Public Dispensary, surgeon to the Eye, Ear, and Throat Infirmary, and medical officer to the Original Ragged Industrial School, Leith Walk.

Of singularly humane, sympathetic, and generous nature, Dr Black was ever moved at the sight of suffering, and he gave his energies and his efforts to bring relief to the victims of disease, especially in the case of the poor, among whom a considerable part of his work was carried on.

Besides his qualities as a practitioner, Dr Black was a man of high culture—a great reader, and possessed of an acquaintance with general literature to an extent not often enough met with in our ranks. He had equally a warm interest in, and a keen appreciation of, the sublime and the beautiful in art.

These gifts made his society much sought after, and brought him many friends, by whom his untimely death is now sincerely mourned.

Dr Black was unmarried. By his own desire he was buried in the New Cemetery at Comely Bank, near to the grave of an intimate medical friend. The number of people, many of them his poorer patients, who turned out to witness the funeral procession pass along the streets, was a touching and eloquent testimony of respect and sorrow for one who had been to them at once their physician and their friend. J. O. A.

Robert Somerville, M.D., F.R.C.S., J.P.

DR SOMERVILLE was born in Dalkeith, studied in Edinburgh, and was one of the graduates of the year 1859, so many of whom have risen to distinction in the profession. He took the licence of the Royal College of Surgeons in 1858, and became a Fellow in 1889.

He chose the country as the seat of his life-work, and after a year or two's practice in Innerleithen he removed to Galashiels to take up the work of Dr George M'Dougall, in which he had for some time the co-operation of Dr John M'Dougall, later of Carlisle and now of Cannes. There he laboured for over forty years, a careful, wise, and trusted family doctor, whose advice was often sought in obscure cases by his neighbours. But in spite of the cares of his large practice,

he managed, like many busy men, to find time for public work. He was a J.P. for the County, a Commissioner of the Burgh, and was for many years Chairman of the School Board. He was a keen politician, a Liberal Unionist, and a Free Trader. In medical matters too he took an active part. He was a past President of the old Border Counties Branch of the British Medical Association, which he represented for many years on the Central Council, where his pawky arguments generally carried weight. He loyally accepted the new arrangements of the Association, but he never was in sympathy with them.

His Harveian Oration, published in this Journal in 1903, delighted all his friends. The grace of its delivery and the felicity of its expression were the admiration of all who heard or read it.

Upright in character, able and faithful in the discharge of his professional duties, active and interested in everything that tended to the good of his fellow-men, it may truly be said of him he rests from his labour and his works follow him.

He bore his long and painful illness with great fortitude and resignation, comforted in the assurance given him by a firm belief in the Christian faith. He leaves a widow and a large family, one of the sons of which has long been associated with him in practice. A. B.

Editorial Notes and News

The New Professor of Midwifery.

As has generally been expected, the Curators have appointed Sir John Halliday Croom to the Chair. It is one of the advantages of the peculiar character of the Edinburgh School that the Curators have in the records of the Extra-Mural School a readily available test of the candidate's capacity as a teacher. Sir Halliday's record in that respect is second to none. Year after year he has taught large and interested classes the elements of obstetrics, and the number of his pupils—many of them now famous—must run into thousands. His professional position is so universally recognised that one has a difficulty in deciding whether he or the University is the more honoured by the appointment. It is a gratifying feature of our Scottish medical life that university position, rather than the amassing of a large private clientele, is the goal of its eminent men. We cannot conscientiously wish Sir Halliday a long career as professor, for our views on age-limits have never been concealed, but we

congratulate him most heartily on his appointment, and wish him much success during his occupancy of the Chair.

Sir Halliday delivered his Inaugural Lecture in the M'Ewan Hall on October 23. The Principal said there was really no need to introduce their new professor to the students. Sir Halliday referred to the history of the Chair, and eulogised his predecessors. He approved the elevation of gynæcology to an independent footing, and referred adroitly to the mutual encroachments of the gynæcologist and the surgeon. The students turned out in large numbers and gave a most hearty welcome to their new professor.

The Sanitary Condition of the Lews.

WE have been hearing a great deal lately about the deleterious influence of town life and the prevalence of physical degeneration among the lower classes of our large towns. Comparatively few people seem to be aware that what are practically slum conditions are quite common in country villages, and that the poorer people in country places often live under conditions which must to a great extent counteract the benefit they derive from abundant fresh air during working hours. No doubt conditions have improved a good deal in recent years in most parts of the country. In our last issue we quoted Dr M'Vail as describing the last seventeen years as constituting for Scotland, and especially for rural Scotland, a period of sanitary revolution. But there is still much room for improvement in most counties of Scotland, and there are parts of the country to which the wave of revolution has never reached at all. From time to time one has heard rumours that housing conditions were not altogether satisfactory in the Hebrides, but to most people the recent report to the Local Government Board for Scotland on the sanitary condition of the Lews must come as a surprising and appalling revelation. On reading the report of Dr Dittmar and Mr Miller, it is difficult to realise that it really refers to a civilised country in the twentieth century of grace.

As an example of the condition of things discovered by the commissioners, let us take their report of visits paid in April to the townships of Arnol and Bragor. The total population of Arnol at the date of the last census was 347. With the exception of three stone and lime houses already built, and one in course of construction, *every house* in Arnol is grossly insanitary, and could be certified as a nuisance under the Public Health Act. There are two classes of houses in Arnol, besides the few stone and lime ones, both equally insanitary. In the

one class of house one enters the byre by a narrow and low passage, on either side of which is a horse stable and sheep pen. In structural continuity with the byre is the living-room, there being no semblance of a partition. Beyond the living-room and byre is a six to seven foot partition separating this space from the sleeping-room, which contains two or three box beds. In all the houses entered there was a bed in the living-room also. The walls are of the usual construction, two rows of loose stones with earth between. Inside there was no clay on the walls, only the bare and wet stones. The floors were clayed, and the peat fire was burning in the centre of the living-room and filled the whole house with an irritating smoke. In some cases there were neither chairs nor wooden seats, but merely a plank resting on large boulders on the floor. The houses were more than usually dark, the only light available in the living-room coming through a pane of glass about a foot square in the thatch. In addition there were two or three irregular holes which acted as smoke and air outlets, but were probably not built for these purposes, but to provide an entrance and exit for the fowls. These nest in baskets hung against the walls of the byre, and generally roost above the entrance door. The living-room is *one with the byre*, and one has to walk over and sink into the manure to get to it. In one house the reporters found the wage-earner lying in bed in the living-room in an advanced stage of phthisis, and expectorating on the floor. In this house the human beings and animals were all living in one large room. The animals included three cows standing above their knees in about four or five feet of manure. This description sounds like a specially bad instance, but the reporters say that it is impossible to single out any particular house or set of houses as worse than any others. They are all in a state that can only be called appalling. The whole township, and every house in it, is uninhabitable and should be condemned, except the three or four stone and lime ones.

In Bragor practically the same state of affairs was found, and cattle-housing was universal. Throughout the district the surroundings of the houses were filthy in the extreme. The water supplies are usually obtained from shallow dip wells often situated in the most low-lying and boggy ground. These are almost universally unprotected, and animals have free access to them.

The report came up for consideration at a meeting of the Lewis District Committee at Stornoway on October 4. The chairman of the meeting, Provost Anderson, made the curious remark that it was quite unnecessary for Dr Dittmar and Mr Miller to come to Lewis to prepare their recent report, for

the whole matter was fully set forth in a memorial submitted by the Lewis Districts Committee to the Local Government Board nine years ago. No doubt the Local Government Board rather simply imagined that if things were known to be so bad nine years ago there had been time for some improvement, yet their commissioners report that it is quite clear that since the passing of the Local Government Act in 1889, the Local Authority has done little to improve the condition of the island. The Local Authority may possibly be hampered by the want of sufficient funds to carry out any thorough measure of reform, but the very moderate measures recommended in the present report are, for the most part, such as the people might carry out for themselves under a little pressure, and they would certainly constitute a decided step towards the removal of a state of affairs which is a disgrace not only to the Lewis Local Authorities, but to Scotland.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Faculty of Physicians and Surgeons of Glasgow.

THE following gentlemen, having passed the requisite examinations of the Conjoint Board, were admitted Diplomates in Public Health:—Harold Sherman Ballantyne, M.B., C.M., Eskbank; Leo Ferdinando Bianchi, M.R.C.P.E., Portobello; John Jardine, M.B., Ch.B., Penicuik; Philip Anthony Harry, M.B., Ch.B., Edinburgh; Richard Caldecott Monnington, M.B., Ch.B., Broughton-in-Furness; François Leon Keisler, L.R.C.P. and S.E., Edinburgh; Kenneth Andrew Moody-Stuart, M.B., Ch.B., Errol; Robert Abraham Logan van Someren, M.B., Ch.B., Edinburgh; Mohamed Ebrahim Sufi, L.R.C.P. and S.E., Edinburgh; Joseph William Sutton, L.R.C.P. and S.E., Newport; David Llewelyn Williams, F.R.C.S.E., Colwyn Bay; Robert Allan Cunningham, M.B., Ch.B., County Donegal; Alexander James MacGregor, M.D., Dunfermline; and George Wight, M.B., Ch.B., Grantshouse.

At the same sederunt the following gentlemen passed the First Examination in Public Health:—William Hamilton Simpson, M.B., Ch.B., New Zealand; David Robertson Dobie, M.D., Crieff; Jamshijd Dadabhai Munsiff, L.R.C.P. and S.E., Edinburgh; and Francis Edmond Larkins, M.B., Ch.B., Edinburgh.

Royal College of Surgeons of Edinburgh

AT a meeting of the College, held on 18th inst., the following gentlemen, having passed the requisite examinations, were admitted Fellows:—Edward Napier Burnett, M.B., C.M., Cullercoats; Philip Sylvester Clarke, M.B., C.M., Edinburgh; Harold Clifford, M.R.C.S.Eng., Manchester; Frank Inglis Dawson, M.B., Ch.B., Midlothian; Elgar Down, M.R.C.S.Eng., Devonport; Hugh Nethersole Fletcher, M.B., Ch.B., Norfolk; Thomas Arthur Green, M.D., Bristol; Reginald John Edward Hanson, M.B., Ch.B., London, W.; Garnet Wilson Harty, M.B., Ch.B., Bristol; Ernest Jermyn Hynes, M.R.C.S.Eng., Edinbane; William Kelty, M.B., C.M., Edinburgh; George Lyon, M.D., Edinburgh; Patrick Frederick M'Farlan, M.B., Ch.B., Musselburgh; Thomas Myles, M.D., Edinburgh; Lloyd Turton Price, M.B., Ch.B., Edinburgh; Thomas William Edmonston Ross, M.B., Ch.B., Edinburgh; Thomas Walter Scott, M.R.C.S.Eng., Victoria; Hugh Neville Adam Taylor, M.D., L.R.C.S.E., Rhayader; Benjamin Philp Watson, M.B., Ch.B., Edinburgh; Edward Colston Williams, M.B., M.R.C.S.Eng., Wigan; and Thomas James Wright, M.R.C.S.Eng., Norwich.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

By ALEXANDER GOODALL, M.D., F.R.C.P.,
Clinical Tutor, Royal Infirmary, Edinburgh

Digestion Leucocytosis and its Diagnostic Significance.—Digestion leucocytosis has been the subject of some recent investigations. With the view of determining its nature, time of onset, extent, and duration, Goodall, Gulland, and Noël Paton (1) made observations on dogs. The animals were fasted on the day preceding the experiments. Next day the leucocytes were counted with the Thoma-Zeiss leucocytometer, and then the animal was fed on as much minced beef and water as it would take. It was found that during digestion a slight preliminary fall in the total number of leucocytes in the circulation might occur. A fairly regular rise in the total number then follows, and reaches its maximum in about four hours after food.

The increase is due both to a lymphocytosis, which is very constant as regards its incidence and degree, and to a polymorphonuclear leucocytosis much more variable in its degree.

The number and varieties of white cells in corresponding mesenteric veins and arteries during digestion are similar, and resemble those in the general circulation, and there was no indication of increased activity of the lymphoid tissue of the intestinal wall on histological examination. The older view that the leucocytes are produced in the intestinal wall is thus controverted. In some of the animals experimented upon the spleen had been previously removed. In them the leucocytosis followed a course exactly similar to that in normal animals.

This observation has since been confirmed by Nicholas and Cot (2), and therefore the spleen may be excluded as a source of the leucocytes. The question of their source has been further studied by Goodall and Noël Paton (3). Samples of blood were taken during the rising tide of leucocytosis from the ear, mesenteric vessels, and bone-marrow. It was found that during proteid digestion, blood from the bone-marrow constantly contains more leucocytes than venous, arterial, or capillary blood from other situations. The lymphocytes show a greater percentage increase than the polymorphs. The number of eosinophils during digestion is usually, but not constantly, increased, and when present the increase is due to a greater out-put from the bone-marrow. Further investigations were made to ascertain whether there might be an addition of white cells from the intestine indirectly by the lymph stream. An examination of chyle from the efferent mesenteric lymphatics, receptaculum chyli, and thoracic duct led to the conclusion that it does not add to the number of leucocytes in the circulating blood during digestion. It would therefore appear that the bone-marrow is probably the sole source, and is certainly the only important source, of the cells which constitute digestion leucocytosis.

Vanstenberghe and Breton (4) contribute a useful paper on the diagnostic value of digestion leucocytosis. Their observations are of interest in having been made on the human subject. They differ from those described above inasmuch as the subject of observation had not previously undergone any unusually prolonged period of fasting, and this circumstance probably accounts for the difference in the extent and time of maximum incidence in the two sets of observations. They find that in man in health there is a digestion leucocytosis which reaches its maximum two hours after food, and which greatly exceeds the daily oscillations of the leucocyte curve in man during fasting.

The following examples are given :—

SUBJECT A.

8 A.M.	Before food, leucocytes	4,650	per c.mm.
Two hours after food,	„	10,850	„ „
Mid-day,	„	9,300	„ „
6 P.M.,	„	4,650	„ „

SUBJECT B. At corresponding times the figures read—

	6,100	12,400	9,920	4,650
SUBJECT C.	6,200	9,300	7,750	3,100
SUBJECT D.	7,750	10,850	—	—

There is thus an increase of from 3000 to 6000 leucocytes per c.mm. two hours after food.

In digestion leucocytosis the increase mainly affects the lymphocytes, while the variations in fasting are due to variations in the number of polymorphs.

Digestion leucocytosis is absent during certain pathological conditions, notably in gastric and hepatic cancer.

This absence of reaction is not connected with the cachexia or anæmia which almost always accompanies these affections.

Thirteen illustrative cases of gastric neoplasm are recorded. Of these we have tabulated the first six.

	Leucocyte count before food.	Leucocyte count two hours after food.
I. Woman, 58, tumour of stomach	18,600	17,050
II. Man, 52, tumour of pylorus	4,650	3 100
III. Woman, 48, tumour of stomach and liver	6,200	3,100
IV. Man, 32, tumour of stomach	18,600	15,500
V. Man, 44, pyloric cancer	18,860	15,500
VI. Man, 56, cancer of stomach	18,600	17,050

In only one of the thirteen cases was a digestion leucocytosis ever found. The absence of digestion leucocytosis may point to a correct diagnosis of tumour in cases where other symptoms might indicate a gastric neurosis. The phenomenon is not a concomitant or result of all neoplastic conditions. In three cases of advanced neoplasm, viz. cancer of the uterus, cancer of the intestine and sarcoma of the hip, digestion leucocytosis was present.

The condition is not only a feature of gastric cancer, as it also occurs in hepatic neoplasms. Nor must it be considered an infallible diagnostic in gastric or hepatic cancer. Digestion leucocytosis may exist in these conditions, but it is often absent in the period of invasion and always absent in the

cachectic phase. In cases where a diagnosis lies between toxic gastritis, simple ulcer, or neoplasm, investigation of the behaviour of the leucocytes after food is imperative.

Eight cases of gastric disease, other than cancer, are quoted, and in each case there was a digestion leucocytosis. The authors are therefore convinced that the absence of this physiological phenomenon is not the result of a mere vitiation, but that it denotes a profound and irremediable modification of function.

Observations are also recorded in cases of disease not neoplastic and not affecting the liver or stomach. There is an interesting group of cases of different forms of tuberculosis. Digestive leucocytosis is usually present. It was absent in three instances. One of the cases was markedly cachectic, another could be accounted for, but the third seemed a definite example. It should be noted that a pre-existing leucocytosis may mask the result of the test. The last group of cases includes chronic nephritis, diabetes, chronic rheumatic arthritis, etc., and in all of them digestion leucocytosis was present. Subject to certain exceptions it may be said that the absence of digestion leucocytosis is a symptom strongly in favour of a neoplasm of the stomach or liver. In other conditions its absence is very rare except in the terminal stages of acute or chronic ailments, when the gastric function is often abolished.

Clinical Experiences with Bioson in Dietetic Treatment.—Mennig (5) reports some remarkably good results following a dietetic treatment and the exhibition of bioson in cases of mal-nutrition.

Bioson is a finely granular, grey-brown powder, without odour, and tasting like cocoa. It consists of a basis of casein, to which there are added 24 per cent. of organically combined iron and 1.2 per cent. of lecithin, which is derived from the addition of 6.5 per cent. of yolk of egg. Cocoa is added to improve the taste of the substance. Patients undergoing treatment receive five meals per day. At half-past seven in the morning a glass of milk, 100 grm. of white bread, and a boiled egg are given. A second breakfast at a quarter-past ten consists of a glass of milk, 100 grm. bread, and 100 grm. of minced beef-steak. Dinner at one is composed of 200 grm. of meat with one of the more nourishing vegetables. Potatoes, beans, peas, rice, ground cereals, fruit, and dessert are given in rotation. At four o'clock the patient has a glass of milk, 100 grm. of bread, and an egg, and at the evening meal at half-past seven a glass of milk, 100 grm. of bread, and 100 grm. of meat are given. At the beginning of the treatment the patient receives only 50 grm. of bread with each meal except dinner, until he

becomes accustomed to the rich dietary. In from six to ten days he should take 100 grm. The number of eggs allowed is restricted to two, as bioson contains 6.5 per cent. of yolk of egg.

With such a diet no forcing is required to get patients to take it, and although the daily increase of weight might be made greater by other means, it excites no dislike for food, and patients willingly carry out the treatment.

Along with this diet, bioson is given in doses of a heaped table-spoonful thrice daily with meals for adults.

By this means a girl of 11, suffering from headache, weakness, and general mal-nutrition, rapidly recovered and gained 3800 grm. in weight in 20 days. A woman aged 42, with tubercle affecting one apex and complaining of neuræsthenic symptoms, gained 2950 grm. in 15 days. A man of 18 suffering from phthisis with hæmoptosis rapidly improved and gained 4000 grm. in 28 days.

Several similar cases are quoted. The improvement is not to be ascribed merely to hospital régime or to the general improvement which takes place in convalescence. Bioson is an easily digestible substance which can be given without danger in almost any illness, even the most severe, including high fever. It has been found especially useful in chlorosis, scrofula, hysteria, and neuræsthenia, but above all in early phthisis. It may be administered with chocolate or milk and its price is reasonable.

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SURGERY

By DAVID WALLACE, C.M.G., F.R.C.S.

NEW CYSTOSCOPES

A LETTER which I received a few days ago, asking me which cystoscope I would recommend to form part of the armamentarium of a hospital, has induced me to write the following abstract.

The great value of cystoscopy in genito-urinary surgery is now generally recognised. It is as valuable in the surgery of the kidney as in that of the bladder, and perhaps the diversity

of methods to attain our end—to see the interior of the bladder and the ureteric openings—is in itself a proof that surgeons acknowledge the importance of this method of examination as a preliminary to treatment. Cystoscopy has been the incentive to the introduction of numerous methods, of varying utility, which have been advocated to ascertain the functionating power of each kidney. When a satisfactory cystoscope for the examination of the interior of the bladder was obtained in 1887, surgeons at once endeavoured to produce modifications in the instrument which would facilitate examination and permit of ureteral catheterisation and intravesical treatment. Caspar, Nitze, Albarran, and others introduced cystoscopes, each of which may have had some advantage over the others, but we may take it that the desired object of catheterising the ureters was attainable by means of any one of them. Objections were raised to such catheterisation primarily because in the male patient it was not infrequently difficult to perform, and because it was considered a risky procedure if the bladder was infected. Kümmel of Hamburg was, and is, a strong advocate of the value of the procedure, and denies that there is, in other than exceptional cases, either difficulty or risk. These instruments for examination of the bladder had all one feature in common, the light internal. Kelly of Baltimore has introduced a cystoscope in which the light is external, and the medium used for distension of the bladder is air ; this method hitherto has been restricted in its use to female patients. One of the chief disadvantages of Kelly's instrument is the need for dilatation of the urethra, and the very awkward position—genu-pectoral —of the patient ; yet the method in the majority of patients is readily carried out and is satisfactory. To catheterise the ureters is easy, and to apply topical remedies or remove growths of small size is not difficult to accomplish.

M. le Dr Cathelin has recently (*Ann. des mal. des org. urin.*, August 1905) introduced a cystoscope which differs from the older instruments in the following particulars. The medium used to distend the bladder is air instead of water : the observer looks at the object directly, examines it in its natural position and unmagnified : the air can be introduced into the bladder at some pressure, so that the position of the patient is immaterial : only the inferior portion of the bladder can be examined, and finally tubes are provided to keep the bladder empty of urine during the examination. The technique for the use of the instrument is practically that for ordinary cystoscopy.

M. Cathelin certainly does not minimise the difficulty of ordinary cystoscopy while he eulogises the instrument he has introduced, and Max Weinrich of Berlin, in the same number of the

journal, points this out with rather more acerbity than is necessary. Weinrich's criticism is replied to by Cathelin in the September number, and naturally he again says all that he can for his new instrument, and points out that for many years he has worked with the older instrument with success, but again emphasises the advantages of his own. Cathelin's points against the ordinary cystoscope briefly are: first, that the inverted image is a source of difficulty, and second, that it is difficult to gauge the size of the object examined. To even the experienced observer, these, he believes, constitute appreciable difficulties, and he asserts that both are got rid of by the use of his cystoscope. One disadvantage in it is that the upper portion of the bladder cannot be seen. This, however, he considers of little moment, as the great majority of bladder diseases are situate in the part which can be brought into view.

If M. Cathelin be correct in the view that the use of his instrument can be acquired by a novice in a few minutes, then perhaps cystoscopy may be brought into the practice of a larger number of the profession. The simpler an apparatus and the more readily it can be used, the greater the likelihood of its adoption and use by the profession generally. To use the new instrument is, however, not so simple as Cathelin endeavours to show, and the difficulties he associates with the older instrument are, I think, exaggerated. One, in effect, neglects the inverted image just as an experienced photographer does, and the approximate size of the object examined can be readily gauged. A disadvantage in the ordinary cystoscope is the small field presented at one time, and many endeavours to increase its dimensions have been made. One of the latest is by Dr Otis (*Ann. des mal. des org. urin.*, 1905), who states that his instrument gives a much larger field, the whole of which is better illumined than the field in the older cystoscopes. Otis has the lamp placed at the end of the outer tube, and uses one which does not become heated—the so-called cold lamp.

The above remarks regarding different cystoscopes do not constitute a complete account of the numerous modifications of the instrument, they are only intended to direct attention to the endeavours which have been made to make the instrument more valuable, and to lead up to my own view regarding the instrument most suitable for the surgeon who uses cystoscopy in the investigation of genito-urinary affections, but who does not have numerous opportunities of practising the method. Fortunately at this date one difficulty has been overcome in cystoscopic work, viz. the need for frequent ureteric catheterisation. An equally efficacious and reliable method of procuring the urine from each

kidney, and in my opinion a method which is fraught with less risk to the patient, has been introduced by M. le Dr Luys. In *Luy's separator* we have a means of collecting the urine from each kidney which is comparatively simple and easy in practice, and at the same time very exact. It should take the place of the ureteric catheterisation in the great majority of patients, whether male or female. If this be granted, then I believe the anterior cystoscope of Leiter, modified by Mr Hurry Fenwick, is perfectly satisfactory. It enables us to examine the whole bladder, and with a little practice, together with thoroughness in our methods, a beautifully clear view is obtained in the great majority of cases. To interpret correctly the appearances seen may not be easy in some instances, but as a rule an accurate diagnosis can be made.

The advice given to the surgeon was therefore to add the latest Leiter instrument and Luy's separator to the armamentarium of his hospital. I believe that with these, cystoscopy can be efficiently done in both the male and female, and that we can estimate as accurately as is possible at present the functionating power of each kidney. I prefer to examine cystoscopically first and then to use the separator, because if the affection prove to be vesical it may be unnecessary to use the separator, while if the condition be renal it is very important to observe the exact appearance of the ureteric orifices.

It is not my desire to imply that ureteral instrumentation is never of value; occasionally cases do arise in which it is most valuable in diagnosis and prognosis. This is well exemplified in a paper by Mr Hurry Fenwick (*Brit. Med. Journal*, June 1905), "The value of the use of a shadowgraph ureteric bougie in the precise surgery of Renal Calculus." In female patients the bougie can be most readily introduced through the Kelly speculum; while in the male, Caspar's ureteric cystoscope may be used. Shadow-producing objects which occupy a site near the ureter or kidney may simulate calculi in the ureter or kidney, and it is to preclude errors in such cases that the author has suggested the use of the shadowgraph bougie. Cases are described and the shadows shown in the paper, and these very clearly demonstrate the utility of the procedure. Mr Fenwick is careful to remark that expert, in contra-distinction to amateur, radiography is an essential for success. He might have added that to have an expert interpreter of the shadows is no less important. Note is also made of the importance of filling the bladder with air when a radiograph of the lower pelvic contents is desired. Illustrations 5 and 6 show the difference of the radiograph when the bladder is empty and when it is filled with air, and demonstrate the utility of the procedure.

DISEASES OF CHILDREN

By JOHN THOMSON, M.D., F.R.C.P.,
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ON HYPERTROPHY OF THE PYLORUS IN INFANTS AND ITS MEDICAL TREATMENT

FEW morbid conditions of infancy have aroused so much attention during recent times as hypertrophy of the pylorus, and in few has the growth of our knowledge been so satisfactory. Within the last ten years we have seen it pass out of the ranks of mere pathological curiosities, and become recognised as one of the diseases which any practitioner may expect to meet with and which he ought certainly to be able to recognise. Within the last seven years a number of surgeons throughout the world have shown us that many of the cases may, if taken in time, be restored to permanent good health by operation.

Now a further important step in advance is being taken. We are coming to see that some of the cases formerly regarded as only to be saved by operation, if at all, will recover quite as satisfactorily under medical treatment only, provided this is begun early. It is also becoming evident that infants who are too weak for any surgical procedure may sometimes be saved by medical measures properly carried out. It is this—the physician's side of the question—which forms the most interesting part of most of the papers which have recently appeared.

The following abstract is taken mainly from an article by Dr G. F. Still of London (*Lancet*, 11th March 1905), and from a monograph by Dr Jussuf Ibrahim of Heidelberg ("Die angeborene Pylorusstenose," Berlin, 1905).

Pathology.

The only essential post-mortem appearance in these cases consists in great thickening of the muscular coat of the pylorus and stomach. Into the vexed question as to how this condition is brought about (if it exists at all, which some still deny) we need not at present enter further than to mention the three views regarding it which have been put forward. These are as follows:—

1. *Pfaundler's.*—That there is no real muscular hypertrophy present and no stenosis, and that the appearance of thickening as well as the obstruction are due solely to spasm of normally developed muscle.

2. *Thomson's.*—That there is great hypertrophy of muscle, and that this is the result of antecedent overwork, probably

from nervous inco-ordination. Also that there is no stenosis beyond that which is caused by spastic contraction of the thickened muscle.

3. *Hirschsprung's.*—That there is real stenosis as well as great hypertrophy; and that the latter is primary in origin and not the result of antecedent over-action.

We gather that Dr Still agrees with the second, and Dr Ibrahim with the third of these views.

Symptoms.

The first important paper dealing with the symptoms of the disease was published by Hirschsprung in 1888. In 1896 a considerable number of papers appeared by Finkelstein and others in various countries, so that the condition soon became recognised in all children's hospitals.

The grounds for a diagnosis of hypertrophy of the pylorus may be summarised as follows:—The patient is healthy at birth to all appearance, and often a particularly fine child. The vomiting, which is almost always the most striking symptom, occasionally sets in immediately after birth. Generally, however, it does not begin for some days or weeks, and may even commence as late as the ninth week. It often starts without apparent cause while the patient is being carefully fed on the breast or bottle. Ordinary treatment by medicine and change of diet only affects it slightly for a day or two at most. At first the vomiting may be slight and uncharacteristic, but soon it becomes frequent and very forcible. The vomited matter is large in amount, representing more than one meal, and it scarcely ever contains any bile. There is no diarrhœa, and the motions and the urine become very scanty if the vomiting is urgent. The child's weight falls rapidly and he becomes extremely emaciated.

The presence of such a group of symptoms during the first few weeks of life should always suggest the possible presence of this disease. They make its presence, indeed, very probable. The diagnosis, however, should *never* be made unless exaggerated visible gastric peristalsis is seen, or a palpable tumour found in the pyloric region.

The visible peristalsis is a very striking phenomenon. A rounded swelling from half a large walnut to half a Tangerine orange in size, appears at the left costal margin, and passes slowly across the abdomen towards the right. Before this tumour has reached the middle line, a second similar one will be showing from under the left costal margin; and sometimes a third may be appearing there before the first has disappeared in the right hypochondrium. The movements can be seen from

a considerable distance. They have, however, to be watched for, for they may be absent for hours at a time. The phenomenon is due to vigorous attempts on the part of a hypertrophied stomach to drive its contents through a contracted pylorus. When it occurs in a young baby with a history of chronic vomiting it amounts to a proof of the presence of this disease.

The other pathognomonic symptom is the recognition by palpation of the hypertrophied pylorus. Like the peristalsis, this is only to be made out occasionally during contraction, as a relaxed pylorus is scarcely palpable. The tumour is sometimes very difficult to make sure of for those who have not felt it before. When it is felt, however, it forms very valuable confirmatory evidence.

Surgical Treatment.

Stern was the first to attempt to cure the condition by surgical measures. The operation which he performed—gastro-enterostomy—was, however, unfortunately unsuccessful. In the following year the same operation was successfully carried out by Löbker and by Kehr. Their success may be said to have ushered in the surgical phase of the subject. Since that time a large part of what has been written about it has dealt with the indications for surgical interference, the choice of the operation to be done, and the best ways of doing it.

Gastro-enterostomy has been the operation chosen most frequently, and it has been successfully performed by Löbker, Kehr, Fritsche, Jäckh, and Trantenroth on the Continent; by Anstey Giles in Australia; and by Stiles in this country.

Loreta's operation of stretching the pylorus was first performed with success by Dr J. H. Nicoll of Glasgow in 1900. He was soon followed by M. Schmidt, Stiles, Burghard, and Grisson.

Pyloroplasty has been strongly advocated by Cautley and Dent, and very successfully performed in several cases by the latter.

Pylorectomy was once performed unsuccessfully by Stiles. It has been abandoned as too severe an operation, and less suitable than the others above mentioned.

Ibrahim regards gastro-enterostomy as the best operation when the child is not extremely weak. In specially feeble babies he recommends either Loreta's operation or pyloroplasty.

The after-treatment in all these operations is in many cases extremely difficult, as the absorption of nourishment seems sometimes to be greatly interfered with in some way. If, however, the child survives the first few months, he is

likely to regain his health completely and the recovery is permanent.

The discovery of any treatment that gave a chance of permanent recovery in such a fatal disease was, of course, an immensely important gain in knowledge, and the brilliance of the surgical success is worthy of the fullest recognition. At the same time, we can scarcely rest satisfied while a disease affecting such frail babies has for its routine treatment a choice of the gravest and most delicate operations in surgery. Our feeling of dissatisfaction is further strengthened by the fact that in the majority of cases even the most successful operation is not followed at once by complete relief. In a number of cases in which the surgeon's part has been done perfectly, the child has yet died from diarrhœa or atrophy, in spite of every care. Any improvements in medical treatment are therefore matters of great interest.

Medical Treatment.

Although the medical treatment of hypertrophy of the pylorus has only come into prominence within the last year or less, it is by no means quite a new subject. In 1896, Finkelstein quoted Heubner as having had several cases, probably of this nature, which had recovered without operation; and Heubner now claims to have had no fewer than twenty cases cured by medical treatment only. In 1899, Batten proved by a post-mortem examination in a case of his which had died from other causes, some time after recovery from pyloric symptoms under medical treatment, that recovery in these cases did not necessarily mean that the diagnosis had been wrong. Others have since made similar observations, and there can be no doubt that a considerable number of genuine cases of hypertrophy of the pylorus have recovered without operation.

The treatment must be carried out with the greatest possible care as to details, and the child should be regularly weighed every two days to gauge his progress. Our object is to get him to retain sufficient food for purposes of nourishment, and with this end in view we try—

1. *To remove all possible causes of irritation* to the stomach. This we do mainly by lessening the bulk of the meals, and so changing their character that they shall contain as little solid residue as possible.

2. *To soothe the stomach* by stomach-washing, sometimes by gavage, by the application of hot poultices over the abdomen, and, perhaps, by the administration of sedatives.

3. *To ease the patient* by allaying the thirst of his tissues,

which causes him great distress so long as his pylorus will not let through an adequate amount of fluid. We do this by rectal and subcutaneous injections of normal saline solution.

Before referring in detail to the measures to be taken to attain these ends, we may say that the ease with which cases yield to treatment varies enormously in different instances. In some the symptoms are so intractable that *nothing* short of operation will save them. In others, surprisingly simple measures may succeed. Thus Still had one case in which the symptoms came on while the child was being carefully fed on milk and barley water; and they subsided rapidly when peptonised milk and bismuth were given. Ibrahim reports similarly easy successes by washing out the stomach, giving the baby nothing but water for twelve to twenty-four hours, and then carefully regulating the quantity of breast-milk given. Generally, however, a great deal of care and perseverance is called for before improvement sets in. It may, for example, be three or four weeks before the weight begins to increase.

(1) Most writers are agreed that a *diminution of the quantity* of food which the child is taking is one of the first points to be attended to. Dr Willoughby Gardner began the very successful treatment of his case (*Lancet*, January 10, 1903) by giving only a teaspoonful every twenty minutes. Of course such very small quantities cannot without danger be continued long, but they almost always have a marked effect in stopping the vomiting, and with a very gradual increase in the size of the feeds it may not return. It is interesting to find that Heubner ("Lehrb. d. Kinderheilk.," Berlin, 1903) follows an entirely different plan in this matter. He allows the patient to take as much as he likes every three hours, believing that when he vomits it up again, as he usually does, he probably retains sufficient to nourish him.

(2) The next question is the *choice of food.* Breast-milk is by far the best thing for these children, if it can be got; and in bad cases it should be drawn off and given iced and in measured quantities. If a wet nurse cannot be got, a number of foods, other than cow's milk, may be tried. Gardner made use, in turn, of whey, maltine and barley water, raw meat juice, and albumin water. Others have succeeded with peptonised milk and butter-milk.

(3) The child is to be *kept very quiet.* Unnecessary moving of his body and handling of his abdomen are to be carefully avoided.

(4) *Washing-out the stomach* has been strongly advocated, among others, by Pfaundler, who thinks that it acts by causing a degree of paresis of the muscular wall. It also has the effect of removing the stagnating remains of former meals. Heubner

has not found it of much value, but still Ibrahim and most other writers strongly recommend it. A Jacques' catheter (Nos. 12-14) is used, and the water should be between 95° and 105° F. in temperature. Instead of plain water, Still uses a solution of bicarbonate of soda (2 grs. to the ounce), and Ibrahim a 1-200 solution of Carlsbad salts. The washing-out should not be repeated more than once, or at most twice, a day, as it is rather a tiring process for the baby.

(5) *Nasal feeding* by means of a small catheter was used once with great effect by Batten for twenty-seven days, but has not been practised much by other writers.

(6) *Poultices* are strongly recommended by Ibrahim and also by Heubner. Heubner has the abdomen poulticed thrice daily, and each time four poultices are applied at intervals of half-an-hour.

(7) *Sedative medicines* have sometimes been recommended. Still Ibrahim and most other writers have seen no great good from their use. Heubner, however, recommends the administration of gtt. $\frac{1}{10}$ to $\frac{1}{20}$ of tincture of opium (G.P.) along with a few drops of tincture of valerian.

(8) Nutrient enemata are very apt not to be retained and they often set up irritation. *Small rectal injections* of saline solution, however, are extremely useful in relieving thirst and are generally very well retained.

(9) *Sub-cutaneous infusion* of sterilised normal salt-solution ($\frac{3}{4}$ per cent.) is of very great value for similar purposes, and may be repeated daily for some time with nothing but advantage.

It is held by some, and among them we find the weighty name of Professor Heubner, that so much can now be done by medical treatment that surgical operation is probably never justifiable. There are not, however, many observers of large experience who go so far as this. Most of those who have seen many cases acknowledge to having seen some whose symptoms were so urgent and so intractable that nothing short of surgery offered any prospect of relieving them.

The question whether any individual case of hypertrophy of the pylorus should or should not be operated on is one of the most difficult and responsible that we can be called upon to answer. In considering it we have to be guided partly by the nature of the treatment the child has already received and the way he has responded to it, and partly by the state of his strength. We have also to take into consideration the child's surroundings and the ability of his parents to provide sufficient skilled nursing to give the medical treatment of the case a fair chance. The possibility of procuring a wet-nurse is another point to be considered, and the special experience of the surgeon

who is available to do the operation is an element not to be forgotten.

There can be little doubt that medical treatment should always be given a careful trial before surgical proceedings are thought of. Some improvement can, practically always, be effected by it; and even if it fail to cure the child, it will probably get him into a better state to stand the operation. On the other hand it is to be remembered that only the closest study of the case can justify our delaying the operation. While the child is gaining in weight and strength it is certainly wise to defer surgical measures. Should he begin to go downhill, or even to remain stationary for some considerable time, he should be operated on without delay.

PATHOLOGY

By T. SHENNAN, M.D., F.R.C.S.,
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Tuberculosis.—An important monograph on tuberculosis has just appeared from the pen of Francis Harbitz, Professor of Pathology in Christiania.

He especially investigated the question of the origin of tuberculosis in children, and particularly with reference to tuberculosis of lymph glands. He attaches great importance to the investigation of the cervical glands. Subsequently he refers to the origin and development of tuberculosis in adults.

His procedure was to take glands from the various groups in the neck, thorax, and abdomen in children dying from all causes and examine them macroscopically, microscopically, and by inoculation into animals for the presence of tubercle bacilli or tuberculous manifestations.

Short reference may be made to the different sections of his work, which well repays careful perusal.

His cases occurred in the years 1898 to 1900, and 1901 to 1904.

In the former period he examined 133 children under fifteen years. Of these 48, or 36.1 per cent., showed signs of tuberculosis, and 85, or 63.9 per cent., were free from any trace.

In the latter period out of 142, 69, or 48.3 per cent., were found infected with tubercle, and the remainder were free.

Of the total number, 117, or 42.5 per cent., were found infected with tubercle. It is to be noted that these cases occurred in a general hospital.

On separating the cases into classes according to age, it was seen that the percentage of the tuberculous infections gradually increased until after the fourth year. The great majority of the children examined showed some signs of tuberculosis, this being a strong argument against congenital (*angeborenen*) tuberculosis.

Of the 117, 72 died of the tuberculosis. Of the remaining 45 dying from other causes, 27 showed latent and obsolete tubercle, detected macroscopically or microscopically.

The latent and obsolete tubercle was found affecting chiefly the lymphatic glands (thoracic 25 times, cervical glands and tonsil 9 times, and mesenteric glands 7 times), and partly the lungs, as a rule simultaneously with thoracic glands.

The chapters on occurrence of latent tubercle bacilli in lymph glands and congenital tuberculosis are of special interest.

Latent Tubercle Bacilli.—In his second series of 142 cases, 1901-1904, he found 18 cases (12.7 per cent.) which showed neither macroscopic nor microscopic signs of tuberculosis after careful investigation, and yet on inoculation into animals produced a tuberculosis, demonstrating the presence of virulent tubercle bacilli.

Of course, as one knows by experience, looking for bacilli, when scanty, in sections of a gland is like looking for a needle in a bundle of hay. He did not find involution forms—Schrön's capsules—in any case, though D'Arrigo and Walsham have succeeded in demonstrating them. Occasionally reddish stained granules and rod-like bodies were seen, but no true bacilli. He thinks that examination of the gland pulp smeared on slides (Spengler, Walsham) might have given better results.

Ten of the 18 cases occurred in the first years of life. In 16 the presence of the bacilli was demonstrated in the cervical glands, and in these alone in 13 cases, the remaining 3 showing simultaneous infection of the mesenteric glands, tracheal glands, and tracheal and mesenteric glands respectively. In one case the mesenteric and retro-peritoneal glands were alone infected, and in one the tracheal glands.

Hence he concludes that the rule is that single groups of glands are infected, and the cervical glands most frequently, though one may demur to his drawing too rigid conclusions from such a small number of cases.

The result of examination of the mesenteric glands is specially interesting in view of the attention which is at present directed towards the alimentary canal as a channel of invasion for the tubercle bacillus.

Granted that the presence of latent tubercle bacilli in glands is proved, the questions arise: (*a*) Do these bacilli possess their

usual virulence? (*b*) How long may they have lain latent in the glands?

(*a*) From arguments Harbitz brings forward, he concludes that it may be taken that the tubercle bacilli not infrequently show less virulence than usual.

(*b*) As to the second question, he refers to Baumgarten's and Von Behring's well-known views as to latency of tubercle bacilli which have entered *in utero* or during early childhood and develop later in life, and argues against these views, though he does not exclude the possibility of the occasional occurrence of such conditions, but he holds that in the great majority of cases infection occurs after birth. His results tell against the probability of tubercle bacilli lying latent and virulent longer than several months. Lubarsch comes to similar conclusions.

One has to distinguish between "swollen" glands, particularly cervical glands, in which the irritamentum is often other than tubercle, and "tuberculous" glands, which are not necessarily much enlarged.

Congenital Tuberculosis.—Here we have to do with the occurrence of fatal tuberculosis at very early ages and with the closely related question of infection before or after birth. Froebelius describes such cases dying of tuberculosis at three days, one week, two weeks, and seven others dying at or below one month.

Harbitz refers to cases dying of marked tuberculosis as early as nine days, three weeks, etc., in which infection must have been intra-uterine.

Bügge has found tubercle bacilli in the blood and organs of newborn children.

Harbitz' own cases vary in age from two to six months. Some of these must be explained by intra-uterine infection, from the progress made by the disease. In others probably the tubercle bacilli lay latent for a time, and then developed later. As to post-partum infection, he refers to a number of observations which go to show that a child infected after birth may die in as short a period as two months. One must admit that a child may die at the age of eight weeks from post-fœtal tuberculous infection, and possibly as soon as five to six weeks.

Localisation and Channels of Invasion.—One must preface any reference to these points by reiterating how difficult they are to determine with confidence—how, for example, a tuberculosis of the thorax, *e.g.*, affecting the glands, does not necessarily or in all cases give information as to the site of invasion.

Harbitz refers to the abundant literature which has appeared within recent years in all countries, in which attempts are made to determine the incidence of respiratory and ingestion tuber-

culosis, and remarks the fact that so little attention has apparently been paid to the condition of the mouth, neck, and cervical glands, even by those who lay especial weight on infection through the digestive tract. He notes also that the nationality of the investigator seems to play a part. At least British results differ very materially from the German.

We can only refer here to Harbitz' own results.

Putting together cases dying of tuberculosis and cases in which tuberculosis was latent, he finds the conditions

Primary in Respiratory Tract in	48	cases or	41 %
„ „ Digestive „	26	„	22 %
„ Resp. or Digest. „	24	„	20.5 %
„ General lymph-gland tub.	11	„	9.4 %
„ Doubtful, or Special Invasion	8	„	6.8 %
	117		99.7

The respiratory tract includes lungs and glands (bronchial, root, and tracheal).

The alimentary tract includes intestines, glands appertaining thereto, and also tonsils and neck glands.

With regard to the respiratory cases, as a rule, the lymph glands are first attacked and the lungs infected from these. This may be taken as a characteristic mark of pulmonary tuberculosis in children. An isolated bronchial gland tuberculosis is, as is already known, somewhat frequent. On the contrary, an isolated lung tuberculosis in children, without or with very slight and clearly secondary lymph-gland tuberculosis, is very rare. One more frequently finds this in later childhood, when lung tuberculosis in other respects begins to resemble that of adults.

With regard to the cases affecting thoracic and abdominal organs or glands equally, and in other mixed cases, *e.g.*, neck and abdomen, neck and thorax—the intermediate glands being little affected, Harbitz upholds the probability of a multiple infection occurring simultaneously or at different dates.

When tuberculosis attacks bone and joints he considers that lymph-glands probably have been first affected, and thence, probably by way of the thoracic duct and blood stream, tubercle bacilli have been carried to these tissues.

The lymph-glands seem to be the favourite site in which the tubercle bacillus settles.

His discussion of tuberculosis of lymph-glands, its spread from one group to another, simultaneous infection of several groups, missing of groups of glands by bacilli circulating in the lymph stream, infection of lymph-glands through the blood

stream, etc., goes into great detail, and is very interesting, but we have no space to consider it at length.

Amongst other points he emphasises the fact that in his cases the mesenteric glands are infrequently infected, either with tuberculosis or with latent tubercle bacilli, as compared with the cervical, and contrasts this with the published results of English observers.

Tuberculosis in Adults.—He finds in adults dying of tuberculosis most cases are from 16—30, and especially 16—25 years. Then the percentage of deaths diminishes to the period 46—50, and then again rises to the years between 61—65.

Out of a total of 1294 adults dying from all causes he found 761, or 58.8 per cent., showing infection by tuberculosis, and thinks that if all the pleural adhesions, and thickenings, scars, and indurations in lungs were examined microscopically, the percentage would rise to 75—80 per cent.

(Francis Harbitz:—*Untersuchungen über die Haufigkeit, Lokalisation und Ausbreitungswege der Tuberculose, etc.* Pp. 164. Kristiania, 1905.)

Actinomyces and Streptothrix.—Dr Jas. Homer Wright's paper on the "Biology of the Micro-organism of Actinomycosis" gained the Gross Prize Essay for 1905.

It forms the first number of the Publications of the Massachusetts General Hospital.

Dr Wright's work is now well known, so that anything from his pen demands attention, and this paper is no exception.

He refers to the contradictory and confusing character of the literature on the subject of Actinomycosis and Streptothrix Infection, and to the absence of intelligent criticism of it.

He shows that some observers have worked with contaminating micro-organisms, and others with organisms derived from the media.

He refers to the two most important publications on the subject, those of Bostroem and of Wolff and Israel, published in 1890 and 1891 respectively, and accepts *in toto* the results obtained by Wolff and Israel, but does not accept Bostroem's work or papers based on his work, as descriptive of true actinomycosis. The tendency lately has been to include all such diseases under streptothrix infections, but Wright claims that there is a disease to which the term actinomycosis should be confined, distinct from the group caused by streptothrices or Nocardia.

In his opinion, the term actinomycosis should be restricted

in its meaning to a suppurative process combined with granulation tissue formation, the pus of which contains the characteristic granules, or "drüsen," composed of dense aggregates of branched filamentous organisms, and of their transformation or degeneration products, including the characteristic club-shaped bodies disposed at the periphery of the granule.

Pure cultures from such cases are obtained with great difficulty, but he has been successful in thirteen cases in man, and two cases in cattle. Such cultures form what seem to be true "clubs" in media composed largely of blood, or blood serum, or pleuritic fluids, and in these only at the periphery of the colonies. No spore-like reproductive elements are formed.

Thirteen of the strains separated were found to be capable of forming the "club"-bearing colonies in the tissues of experimental animals.

Because this organism does not grow well on all ordinary culture media, and practically not at all at room temperature, he does not believe that it has its usual habitat outside the body, but thinks it probable that actinomyces proper is a normal inhabitant of the buccal secretions and of the alimentary tract. If this be so, the part played by foreign bodies so frequently found in actinomycotic lesions is, by their traumatic and irritative effects, to furnish a nidus in the tissues so that actinomyces can enter and develop.

This seems to be the weak part in Wright's arguments, and the part which will not at once be accepted, requiring further investigation and confirmation.

These characters are not found in the cultures or lesions—natural and experimental—produced by the other group to which he confines the terms Streptothrix or Nocardia, etc.

These organisms do not occur in compact aggregations as in actinomycosis. They are characterised by transformation of their homogeneous non-septate, truly-branching filaments into chains of spherical bodies easily separable from one another, and constituting reproductive elements of the nature of spores. Some members of the group cause suppurative processes, *e.g.*, in cases described by Nocard, Eppinger, Aoyma and Miyamoto, M'Donald, Foulerton, and others.

According to Bostroem and others they grow at room temperature and on all culture media, even on sterilised water. Members of the group are widely distributed on grains, grasses, and in the outer world generally, and are carried into the tissues on foreign bodies.

New Books and New Editions

Enlargement of the Prostate: Its History, Anatomy, Ætiology, Pathology, Clinical Causes, Symptoms, Diagnosis, Prognosis, Treatment, Technique of Operations, and After-Treatment. By JOHN B. DEAVER, M.D., Surgeon-in-Chief to the German Hospital, Philadelphia; assisted by ASTLEY PASTON COOPER ASHHURST, M.D. Pp. 266, illustrated with 108 full-page plates and a coloured frontispiece. London: Rebman, Ltd. 1905. Price 30s.

THE work of Mr John B. Deaver in surgery, in all its aspects, is so well known that we turn the pages of this book with eager interest to learn his views upon one of the most important recent advances in surgery. At the outset the author refers to the history of the condition termed enlargement of the prostate, and then directs attention to the acrimoniously debated subject of enucleation of the gland. We have much sympathy with Mr Deaver's position. Mr Freyer may have been indiscreet in his methods of discussion, but, as Deaver says, "it seems a pity that so many controversies in regard to surgical priority are so constantly arising, and it appears that prostatic surgery is particularly unfortunate in this respect." "Whether or not every shred of prostatic substance is removed by Freyer's operation is of very little consequence; who first performed such an operation is of less; and whether it is anatomically possible or not is of no consequence at all, since the results in Mr Freyer's cases speak for themselves, and he has aroused the profession, not only in his own country, but in France and America as well, to the realisation of what a brilliant chapter of prostatic surgery is unrolled in his achievements." In this, as in some other parts of the work, the author writes in a Gallio spirit which is occasionally not to be commended (page 53). For the practical surgeon to disregard the etiology of pathological conditions merely because it is not understood would be unfortunate, and tend to empiricism in treatment.

In the embryology, anatomy, physiology, and histology of the prostate, Dr Deaver brings forward nothing new, but the illustrations are clear and the text lucid. The pathology and etiology are also discussed in the usual way, nothing of any special interest being advanced. The various views which have been advanced from time to time are referred to, and then the author in effect says it does not matter to practical surgeons, the main thing is to appreciate how best to treat the condition to prolong life.

The whole subject of catheterism is discussed and described, and the opinion given "that every patient should have a trial of catheter life." He advocates in certain cases that a catheter should be tied into the urethra, and prefers to use a red rubber instrument. If it be not satisfactory, a silver catheter may be used. The method he describes of tying in a rigid instrument is not so good as the usual method adopted in this country.

Cystoscopy is not, in the author's opinion, of much value as an adjuvant to diagnosis. He deprecates its use (page 111), but some of the remarks regarding it indicate an imperfect knowledge of the use of the cystoscope.

The treatment of prostatic enlargement by the more radical measures is very fully considered by the author, and he leans to suprapubic prostatectomy as the method of choice. We are interested to observe that he considers drainage by the suprapubic route more effectual than by the perineal. Bottini's operation should, he believes, be very seldom adopted, as its results are extremely uncertain.

Dr Deaver writes very clearly and concisely, the illustrations are numerous and well chosen, but we cannot but feel that this work has been to a great extent compiled from the work of others, and that the author fails to bring forward the great mass of personal clinical material and experience which has enabled him, in other departments of surgery, to write with authority and add much to the practice and science of his art.

A Manual of Surgery for Students and Practitioners. By WILLIAM ROSE, M.B., B.S. Lond., F.R.C.S., Emeritus Professor of Surgery in King's College, London, etc.; and ALBERT CARLESS, M.S. Lond., F.R.C.S., Professor of Surgery in King's College, and Surgeon to King's College Hospital, London, etc. Sixth edition. London: Baillière, Tindall & Cox, 8 Henrietta Street, Covent Garden. 1905.

THIS well-known Manual of Surgery has now entered on its sixth edition, and the desire of the authors to keep the book abreast of the times has led to many extensive alterations being made. While the classification and arrangement of the subjects remain much the same, new chapters have been inserted and many of the others practically rewritten, omitting methods of treatment which have now been abandoned. The treatment of hypertrophy of the prostate affords a good example of this eliminating process, for we find the older methods of treatment with which the former edition dealt have been entirely discarded for the method of prostatectomy which is now so universally

employed. Amongst the new chapters we find one on Bacteriology, Examination of the Blood, Diseases of the Skin, etc., all of which will be found of value. The section on Abdominal Surgery has also been largely extended.

Improvements have also been made in regard to the illustrations. Their number has been increased as well as their quality, and what adds considerably to their value and interest is the fact that photographs largely replace the older figures. Many excellent skiagrams are introduced.

The completeness and simplicity which made the former editions of this work so popular amongst students has in no way suffered by the changes that have been made, and in spite of he increasing number of surgical text-books available now, we have no hesitation in saying that the new edition of Rose & Carless will still maintain the high favour enjoyed by its predecessors.

Lateral Curvature of the Spine and Pelvic Deviations. By RICHARD BARWELL, F.R.C.S., Consulting Surgeon, Charing Cross Hospital; Surgeon, Cripples' Home. Sixth edition. London: Baillière, Tindall & Cox, 8 Henrietta Street, Covent Garden. 1905.

THIS little book, which contains a hundred pages, succinctly explains the method of treating lateral curvature of the spine which the author has found from an extensive experience to be the most effective. Since the first edition of this work which appeared in 1868, the treatment has undergone so many radical changes that this is practically a new book. The exercises and special apparatus with which it deals have been devised on a sound anatomical knowledge and are applied on scientific lines. For the better elucidation of the text, upwards of fifty illustrations have been introduced, which, though somewhat crudely reproduced, serve their purpose. Practitioners should find in this little book many practical hints to assist them in carrying out effective treatment for spinal curvature.

A System of Surgical Nursing. With an Appendix containing useful Formulæ, Emergency Drill, etc. By A. N. M'GREGOR, M.D., F.F.P.S.G., Assistant-Surgeon to the Glasgow Royal Infirmary. Pp. 554. Glasgow: David Bryce & Son.

THIS is intended, as stated in the Preface, as a text-book for the teaching of surgical nursing. It really might be used with great success as a text-book of surgery for a junior student, and

also as a manual of practical instruction for the instrument-dresser, for the assistant-surgeon, as well as a priceless aid to the memory of the house-surgeon in preparing for an operation. Admirably arranged and full of most valuable details of instruction in the antiseptic treatment of wounds, of patients, of instruments, and of the surgeon's hands, it is a work that will be welcomed by everyone who has any duty in the preparation of the patient or the theatre. The surgeon who is assisted by dressers or nurses who have mastered the contents of this work will find his operation work half done and many of his anxieties shared and minimised. The very existence of such a work addressed to nurses shows the extraordinary change in the position of the trained nurse during the last quarter of a century. A woman who is supposed to understand and assimilate its contents is being trained as a house-surgeon rather than as a nurse, and to put this book into the hands of a young probationer would be to discourage her hopelessly. No doubt a certain amount of knowledge of the pathology of disease and the processes of repair in wounds increases the interest with which a nurse watches a case; but much of the information given in the book is too detailed and too technical for the ordinary nurse to appreciate. For the senior nurses who have charge of the instruments and dressings, or who have to prepare the theatre, there is a mine of priceless information admirably arranged. For the highly specialised experienced sister of special surgical wards the book will be a treasure, and the dressers and clerks may study it with advantage. For the ordinary probationer of the first year it is too strong meat, and her matron should tell her what to read and what is beyond her powers. Were it put into her hands as giving an idea of what she was to aim at, nothing but discouragement would result. The work is the outcome of much labour, and should stand as a work of reference in the house-surgeon's room, in the matron's office, and in the library of every nursing home.

A Guide to the Administration of Ethyl Chloride. By G. A. H. BARTON, M.D., Anæsthetist to the Throat Hospital (Golden Square), etc. Pp. 36. London: H. K. Lewis. 1905. Price 1s. 6d.

THIS is a pamphlet dealing with the practical aspect of ethyl chloride administration.

Of particular interest are the descriptions of a method devised by the author for the continuous administration of the anæsthetic in operations on the throat and nose, and of an

ethyl-chloride-chloroform sequence, whereby chloroform anæsthesia may be rapidly established.

The latter, it is pertinently pointed out, is "not intended for babes and sucklings"!

A Guide to Anæsthetics for the Student and General Practitioner. By THOMAS D. LUKE, M.B., F.R.C.S.Ed., Instructor in Anæsthetics, Royal Infirmary, Edinburgh, etc. Second edition. Pp. 135. Edinburgh and London: Green & Sons. 1905.

IN this little work the author has wisely omitted all unnecessary and contentious matter, with the result that he has produced a book giving a reliable, straightforward, and well-written account of the anæsthetics in daily use. Special attention is given to the methods of administration.

The book is one that should be appreciated by the student, and will not be without value to the practitioner.

Urine Examination Made Easy. A Method of Examining Urine with the Common Tests fully Described. By THOMAS CARRUTHERS, M.A., M.B., Ch.B. London: J. & A. Churchill. 1904.

THIS little book comprises notes prepared for the teaching of urine examination to nurses. No doubt the demonstrations were useful to the nurses, but the book itself seems hardly to justify its publication. It is entitled "Urine Examination Made Easy," but it is only so made easy by ignoring the numerous pitfalls and fallacies which attend even the routine examination for sugar and albumen.

International Clinics. Edited by O. J. KELLY, A.M., M.D. Vol. iv. 14th series. London & Philadelphia: J. B. Lippincott.

THE contents of Vol. iv. of the 14th series of International Clinics seems quite up to the standard of its predecessors in value and interest. There are contributors from all parts—England, America, Canada, France, and Germany. The dechloridation treatment is discussed by Javal of Paris, radium in its treatment of lupus by Metzenbaum of Ohio, and the clinical significance of albumosuria by Senator.

The volume is well printed, very well illustrated, and is a valuable contribution to the progress of clinical work.

Amongst the surgical papers, one of the most striking, though by no means the most convincing, is on the Operative

Treatment of Constipation, by Arbuthnot Lane. The author holds that the large intestine is of little use to man, and that in constipation it should be obliterated by anastomosing the ileum to the upper part of the rectum. It is to be hoped that the author's views may not meet with general acceptance, or chronic constipation may become an exceedingly fatal disease.

Medical Chemistry and Toxicology. By JAMES W. HOLLAND, A.M., M.D., Professor of Medical Chemistry and Toxicology, Dean Jefferson Medical College, Philadelphia. Pp. 592, fully illustrated. Philadelphia and London: W. B. Saunders & Co. 1905. Price 15s. net.

WE have long held the opinion that there is great scope for change and improvement in the teaching of chemistry to medical students, and the above-named text-book is a laudable effort in this direction. As the author points out, a due proportion must be established between the inclusion of medical chemistry and the avoidance of extraneous matter which might tend to render more difficult a subject already sufficiently trying to the junior student. We find, accordingly, an intentional omission of many matters included in the text-books of pure chemistry, such as the rarer elements and their compounds, and details of manufacturing and metallurgical processes. On the other hand, the leading principles of chemical and physical philosophy are clearly enunciated, and special mention is made of those recent developments in physical chemistry which have so important a bearing on pharmacology, physiology, and advanced clinical chemistry—such matters, for example, as cryoscopy, electrolytic dissociation, osmotic pressure, mass-action, and radio-activity. The text-book is thoroughly modern, and the teaching throughout based on the latest views of the ionic theory, though to the student who has previously acquired a smattering of chemistry under the old régime the occurrence of such terms as "ferrocyanidion," "triferrion," "hydroxidion," and so forth, is apt at first to be somewhat bewildering.

The first fifty-six pages are devoted to elementary physics, and treat of such matters as specific gravity, latent and specific heat, galvanism and electricity, the spectroscope, polariscope, and similar apparatus. The remainder of the book is devoted to medical chemistry proper (including that required for materia medica) and toxicology, and may be divided into four sections, the first dealing with the non-metallic elements and the principles of chemical philosophy; the second with the metallic elements; while the remaining two treat of organic and clinical

chemistry respectively. The aim of the book is to treat the subject from the standpoint of the medical student, and to discuss the elements and their compounds in relation to practical medicine. Turning, for example, to the element magnesium, we find that its distribution and preparation are dismissed in a few lines; its properties and uses as a metal are then briefly considered; and thereafter only those compounds are discussed in detail that are used in some way or other in practical medicine. Under each the dose and action are given, and any point of importance in medicine is emphasised. The section concludes with tests for magnesium compounds.

When the substance is toxic, the symptoms of overdose, fatal period, fatal dose, antidotes, and post-mortem appearances are detailed, as well as somewhat full instructions as to the isolation of the poison from the body and the means of identification. This makes the work too advanced in many respects for first and second-year students, and the analytical details are even fuller than is necessary for students attending forensic medicine. Arsenic, for example, has no fewer than twenty-seven large pages devoted to it. The sections dealing with organic chemistry are admirable in every way, though rather fuller than students of medicine require in their earlier years; they will prove valuable, however, for reference later on. A short account of stereo-isomerism is given, and space is devoted to the lysins, agglutinins, and precipitins. The last seventy-five pages deal with the chemistry of urine, gastric contents, blood, and milk, chiefly from the clinical standpoint. Gowland-Hopkins' handy method for estimating uric acid is not given, nor is there a really useful detailed description of Kjeldahl's process.

Only one error was discovered in the text, viz. on p. 323, where the formula of potassium ferricyanide is given as "$K_3Fe(CN_6)$" instead of "$K_3Fe(CN)_6$." The printing and general get-up are excellent, and there are many good illustrations and a few coloured plates. This work should prove a valuable text-book to the medical student throughout his entire course.

The Infectivity and Management of Scarlet Fever. By W. T. Gordon Pugh, M.D., B.Sc., London, Senior Assistant Medical Officer, North Eastern Hospital, Metropolitan Asylums Board, London. Pp. 21. London: J. & A. Churchill. 1905. Price 1s.

The Medical Officers of Schools Association has issued in pamphlet form this address, delivered to the Association by Dr Pugh.

The author reviews the personal sources of infection, and concludes that transmission of scarlet fever depends rather upon nasal and aural discharges than upon desquamation of the skin. Rhinitis especially is regarded as an infective complication. It is suggested that return cases may be due to the occurrence or recurrence of rhinitis or otorrhea after recovery has apparently been complete. As to the management of scarlet fever, the author advocates more complete isolation of individual cases and less mingling of patients in various stages of convalescence. Cubicle wards are recommended instead of the ordinary hospital wards. Also, after leaving hospital, patients should not be regarded as certainly free from infection, but precautions against the conveyance of infection should still be taken for another month.

Essentials of Physiology for Veterinary Students. By D. NOËL PATON, M.D., B.Sc., F.R.C.P.Ed., Superintendent of the Research Laboratory of the Royal College of Physicians of Edinburgh; Lecturer on Physiology, School of Medicine of the Royal Colleges, Edinburgh; formerly Professor of Physiology in the Royal Dick Veterinary College, Edinburgh. Edinburgh: Wm. Green & Sons.

THIS is a clearly-written, excellent text-book. It is well described by its title as the Essentials of Physiology, for all that is essential for a Veterinary student, or a student in the Junior Physiology class in college or university, to know, is contained in it. The style is simple and clear, and the student cannot read each subject treated of without having a desire to know more. For example, a concise, clear account is given of the development and structure of bone, followed by a short yet comprehensive note on its chemistry, and one on the points to be remembered in connection with it. Muscle is dealt with similarly, and the rather puzzling subject of the electrical phenomena of muscle very well explained. In dealing with reflex action, he gives a lucid, simple explanation with excellent diagrams, showing in the knee-jerk both the reflex arc and the way in which the time taken may be ascertained. In dealing with the nervous system he has availed himself of the researches of Bruce, so that what is most recent in this subject is laid before the student. Again, before discussing the function of the liver in relation to absorbed food and to general metabolism, he gives a lucid account of its comparative anatomy. Nothing better enables a student to understand not only the functions

but also the derangements of an organ than a knowledge of its comparative anatomy. One word more. The subject of respiration is very well done. What in it is physical and what is physiological is clearly laid before the student. He has not only nothing to unlearn when studying a more advanced work on the subject, but his desire for such work is whetted by what he has read in this. The illustrations are original and good, and form a valuable part of an excellent text-book.

Text-Book of Histology, including the Microscopic Technic. By Dr PHILIPP STÖHR. Translated from the tenth German edition by Dr EMMA L. BILSTEIN. Edited, with additions, by Dr ALFRED SCHAPER. Pp. 470, with 353 illustrations. London: Rebman, Ltd. 1904.

WE have received the fifth edition of Professor Stöhr's well-known text-book of Histology. On comparing this new edition with its predecessor, we find that many additions have been made. The work has always been noteworthy for the number and excellence of its diagrammatic representations of the tissues, and these have been increased by some fifty new illustrations in this edition.

While all the tissues are succinctly yet adequately described, one may single out for special mention those chapters which deal with the structure of cells, the elements of the nervous system, and the microscopic anatomy of the eye and ear. In the description of glands, the recent investigations of Maziarski have been incorporated, and the work of Felix has been utilised in detailing the structure of the seminal passages.

The text-book is essentially designed for the use of students, and as such must prove of great value.

"First-Aid" to the Injured and Sick: an Advanced Ambulance Handbook. By F. J. WARWICK, B.A., M.B. Cantab., etc., and A. C. TUNSTALL, M.D., F.R.C.S.Ed. Third and revised edition. Pp. 236. Bristol: John Wright & Co. 1903. Price 1s.

THIS is a very compact and handy pocket volume arranged on the usual plan of books upon "First-Aid" work, Part I. dealing with the structure and functions of the body, so as to lead up to the more practical instruction contained in the rest of the work. But is it necessary, even in an "advanced ambulance" book, to

describe such minutiæ as the functions of the glosso-pharyngeal nerve, or differentiate the true from the false pelvis, etc.? There seems to be frequently a needless wealth of details, both physiological and anatomical. The shape of the vertebral column is said to "resemble a pyramid" (p. 11), surely a somewhat doubtfully appropriate term. Part II., on the other hand, dealing with "first-aid" methods of diagnosis and treatment, is not only clearly written but very fully illustrated, particularly in regard to the use of the triangular handkerchief. One remarks, however, the absence of any reference in the treatment of capillary hæmorrhage to the importance of elevating the wounded part; nor is the practical importance of measuring splints upon the *sound* limb, and avoiding pressure upon blood-vessels in the application of temporary splints, insisted on. As regards poisoning from gases, the treatment begins, "Remove the patient, etc.," but nothing is said as to the precautions requisite on the part of the rescuer; the dangers, also, of applying hot-water bottles "to the feet" of a paraplegic patient are not mentioned. While there are thus some not unimportant omissions, the volume can be warmly recommended as a text-book for an ambulance class, concise and clearly expressed, moderately priced, and having a good index.

A Junior Course of Practical Zoology. By the late A. MILNES MARSHALL, M.D., D.Sc., M.A., F.R.S., Beyer Professor of Zoology in Owen's College, Manchester; and the late C. HERBERT HURST, Ph.D., Lecturer in the Victoria University. Sixth edition, revised by F. W. GAMBLE, D.Sc., Lecturer in Zoology in the University of Manchester. Pp. 490. London: Smith, Elder & Co. 1905.

WE have nothing but praise for this admirable book. It is clearly written and admirably arranged for students working in practical classes. Many of those beginning zoological work for the first time will find the subject as given in it rather difficult; but this is in no way the fault of the book, but of the system, or rather want of system, which sends students from our schools to begin the study of zoology with no previous training whatever. Notwithstanding this drawback on the student's part, the directions for dissection and the methods given are so clearly laid down that he can by a fair amount of application master them with little or no help from his teacher or demonstrator. The diagrams are very accurate, and are carefully executed. As examples of this we may note the neck

of the rabbit with the figure on page 372, and the cranial nerves of the dogfish, page 275, and fig. 59. While every part is excellent, we think that on the rabbit is best in detail. If we might venture on a suggestion, it is that the frog, asked in so many examinations, might be included. If this could be done without unduly increasing the size of the book, the student would find in one text-book enough to prepare him for any examination in practical zoology he is likely to undergo. In all that goes to make an admirable and useful text-book, not only is it second to none, but, like the sword of Goliath, there is none like unto it.

Description of Brain and Spinal Cord in Hereditary Ataxia. By LEWELLYS F. BARKER. The Decennial Publications, University of Chicago Press. 1903.

IN 1892, Dr Sanger Brown of Chicago gave a clinical account in *Brain* of a form of hereditary ataxia occurring in an American family, remarkable for the fact that he had been able to trace it through four generations. Altogether twenty-four members (equally divided as to sex) have been affected, and up to the date of the above paper, three have been investigated post-mortem, one by Meyer (*Brain*, 1897), and the other two now by Barker. It may be mentioned that the cases do not resemble Friedreich's form of ataxia at all closely. They have been classed with other cases of a cerebellar type, and it was freely assumed that the cerebellum would prove to be the part mainly affected. This has not turned out correct, as will be seen further on. The chief symptoms were increased knee-jerks, cerebellar gait, visual troubles, defects of articulation, progressing weakness. It began most frequently between the ages of sixteen and thirty-five. The report on the two cases investigated by Barker is a striking example of skill and competence. Not only is the description unsurpassed for thoroughness and lucidity, but it is accompanied by admirably clear illustrations—forty-six figures in eleven quarto plates. The anatomical account of the naked eye examination of the two brains "reveals no deviations from the normal type which can be regarded as standing in relation to the disease from which the family suffered," but is interesting in that "it presents an opportunity for comparing the similarities and differences in the brain-surfaces of two brothers." The brains and cords of both cases were relatively small, the cord, medulla, and pons in each case looking smaller in proportion than the cerebrum. Degeneration was found

chiefly in the cells and fibres of centripetal paths, including one system of exogenous fibres of the posterior funiculus (apparently corresponding to the third fœtal system of Trepinski), the dorsal nucleus of Clarke, the direct cerebellar tract and its continuation in the restiform body. In these the degeneration was extensive. There was also some involvement of the dentate nucleus of the cerebellum and the brachium conjunctivum, and probably also of the inferior olive of the medulla. It is a pity in view of some recent findings that the peripheral nerves were not placed in Barker's hands. The glia tissue was much increased in the degenerated areas, but the whorl-like arrangement described by Déjerine and others does not seem to have been present. Barker promises another paper dealing with the relation between the clinical and the histological points and the classification of the cases.

First Annual Report of the Henry Phipps Institute for the Study and Treatment and Prevention of Tuberculosis. Pp. 265. Philadelphia: Henry Phipps Institute.

THE Henry Phipps Institute of Philadelphia was founded and endowed in 1903 by him whose name it bears. The purposes of the Institute as set forth in its Charter are:—"The study of the cause, treatment, and prevention of Tuberculosis, and the dissemination of knowledge on these subjects; the treatment and cure of Consumptives. The benefits shall be administered without regard to race, creed, or color."

The Institution to commence has been supplied with 152 beds, and the completeness of the equipment on the medical side is unequalled. Each department is presided over by a medical man possessed of special knowledge in his own department of work. There are in all sixteen resident doctors. The report which is now issued supplies us with the knowledge acquired in each of those departments, together with verbatim reports of the public lectures on the subject delivered under the auspices of the Institute by Osler, Sims Woodhead, Moragliano and Trudeau respectively, during the past year.

Although the time for work has been short, to so good purpose has it been put that here the statistician, the neurologist, the dentist, laryngologist, pathologist, and ophthalmologist alike may turn his attention with profit, secure in the expectation that he will find facts of cardinal value culled from the field where his subject touches the great Tuberculosis problem. To those interested in the study of Tuberculosis we can most heartily recommend this book as the record of honest, painstaking, and valuable work.

Notes on Foods, Drugs, &c.

Diabetic Foods.

WE have received samples of **Messrs Callard & Co.'s Diabetic Foods,** and can report that they are trustworthy in what they claim to be, free from starch and sugar. In the case of the gluten preparations, the proportion of starch is stated by the proprietors not to exceed 4 per cent. This we can confirm.

Few diabetic preparations are palatable, but Messrs Callard seem to have attained very considerable success in the substitutes they offer to the public for the usual starch and sugar foods. Some of them are distinctly palatable, such as the fancy biscuits and the savoury preparations, whilst even the Casoid bread makes fair toast. Amongst the preserves there is marmalade, which though somewhat too gelatinous to suit the ordinary palate, is still a fair substitute for the usual breakfast-table conserve. Though it contains a copper-reducing substance in an alkaline solution, the reduction is not due to the presence of sugar, for there is no ozason given with Phenylhydrazin, and the fermentation test proves negative. The manufacturers do not claim cheapness for their products, but that they are reliable, and this, we think, with justice. They have certainly succeeded in offering to the invalid much more palatable preparations than the majority of diabetic foods.

FROM **Messrs Allsopp** we have received samples of their **Lager Beer** and **Invalid Stout.** Of the former, we can say that it is as near an approach to the real made-in-Germany article as any we have sampled, and to those who find the ordinary beer of this country too heavy, a trial of this pleasant light lager may be commended.

Time was when stout was almost universally recommended as a tonic, and there is a well-known story of a physician, himself a teetotaler, who prescribed two pints of it along with a pound of beef-steak as the regular lunch of a patient who was overworking himself. As was to be expected, the patient found himself quite unable to do any work in the afternoon, and thus the physician's end was achieved. Messrs Allsopp's invalid stout is not of that heavy kind. It is much more suited for the more ordinary tonic purposes, and those who aim at soporific effects will have to try some other brand.

All Communications—including **BOOKS** *for* **REVIEW** *and* **EXCHANGE JOURNALS**—*are to be addressed to* THE EDITORS, 7 *Manor Place, Edinburgh,* AND NOT TO 43 CASTLE STREET.

DECEMBER 1905.

THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

CRIMINAL ABORTION [1]

By Emeritus Professor A. R. SIMPSON, M.D., D.Sc.

GENTLEMEN,—When, on the 9th of September, I got a letter from your excellent Secretary, telling me that the Council of the Forfarshire Medical Association had agreed to invite me to give on the 6th of October an Inaugural Address for the ensuing session, I felt that I was the recipient of a kindly compliment—a professional honour. I had at the same time a feeling of something like dismay. To decline the honour would be ungracious. To be prepared worthily to meet it on such short notice was impossible. I had just proclaimed, *urbi et orbi*, that my medical career had come to an end. I was in the Highlands for a month's rest before getting ready to leave Edinburgh for the winter.

I had had it in my mind for some time to write an article from the ethical point of view on Criminal Abortion, and intimated to Dr Miller that if he thought a paper on that subject would meet the requirements of the situation it would be a real pleasure to me to accept the invitation of your council. Your President having given his approbation, I have ventured to come to you with somewhat slender provision. The matter, however, is well worthy of consideration by a group of medical practitioners, for the crime of procuring abortion is all too common, and the suspicion of its occurrence gives rise to delicate and difficult enquiries. It has been common in all times and among all kinds of people. The phrase in the Hippocratic oath that forbids graduates from the college at Coös to administer to women pessaries that would cause abortion, is an indication of the prevalence of the practice in

[1] An Inaugural Address to the Forfarshire Medical Association at Dundee.

Greece in its palmiest days, that finds full confirmation in the writings of Greek philosophers, who sometimes speak of it with approbation. Aristotle, *e.g.*, admits that in married life if conception occurs contrary to expectation, abortion may be had recourse to before the fœtus has the feeling of life; "what is in accord," he adds, "with the sacredness of law in such a case is no longer so when the fœtus has quickened."

Many references are found to the practice of abortioning among the Romans, indicating the victims who willingly or unwillingly were subjects of the crime, and describing the culprits with their drugs and appliances. Seneca, writing from his exile in Corsica to comfort his mother Helvia, calls to mind her many virtues, and among the rest he says: "You were never ashamed of reproduction as if it aged you; you never tried to hide your pregnant abdomen as if it were an unbecoming burden, according to the fashion of others who want to be admired for their figure; and you never destroyed the germ of life that had begun to develop in your womb."

When a son could congratulate his mother on the score of her never having been guilty of abortion, we can see how prevalent the practice must have been in their social circle, and can understand how needful it was that laws should be passed sentencing those who were guilty of it in varying degrees to fine, imprisonment, and death. The crime was committed among all classes of the community, from the members of the imperial house to the meanest slaves in Rome.

The nefarious practice that was thus so common in Greece and Rome was carried on also among other nations of antiquity, has been continued through the centuries, and is found to-day not only among savage races in all quarters of the globe, but among the nations who have developed the highest forms of civilisation. Their legislative codes provide for the condign punishment of those who are found guilty of participation in the crime, but whilst occasionally a criminal is caught red-handed, the number of cases of conviction is no way commensurate with the frequency of their misdeeds, which go on in untold numbers of cases unknown and unsuspected. French and German authors like Tardieu,[1] Brouardel,[2]

[1] "Étude Médico-légale sur l'Avortement," 7th edition, 1904.
[2] "L'Avortement," 1901.

Gallard,[1] Lewin,[2] Fabrice,[3] and others show how rarity of conviction is no indication of rarity of this crime, and indicate how a general practitioner may often have under his care a patient whom he treats as a case of natural abortion, but in whom, without his knowledge, it may have been started artificially. Our Transatlantic colleagues[4] deplore the extent which the evil practice has attained in America, where the number of men and women who are known to make a business of abortioning seems to be greater than in Europe. Great Britain is in no position to cry Shame on any of its neighbours. About ten years ago a medical man, whose name had previously been erased from the Register for some misdeed, was sentenced to seven years penal servitude for causing the death of a lady in good society by an illegal operation. He had, however, long before he came under the grasp of the law, had a notorious reputation, so that ladies who applied to other medical men to be disembarrassed of a pregnancy would say when they were refused, "If you won't help me I'll just go to Dr ——." Not long after, a woman came to settle in Edinburgh, professedly as a sick-nurse. But she was found to be practising abortion so freely that she was condemned to five years imprisonment on the testimony of some of her victims and their friends, and it was said that her practice had reached into quarters where no one would have suspected that crime could enter.

I. *The Subjects.*

If we consider the women who are the subjects of criminal interference with the progress of pregnancy, and the motives under which they yield to the temptation, we find :—

1. Those who desire to conceal the physiological consequence of illicit intercourse. An unmarried woman or a widow has allowed herself to be seduced, and the prospect of the loss of character and position which the birth of a child

[1] "De l'Avortement au point de vue Médico-légale," 1878.

[2] "Die Fruchtabtreibung durch Gifte und andere Mittel," 1904.

[3] "Lehre von der Kindesabtreibung und vom Kindsmord," 1904.

[4] Professor T. Gaillard Thomas, "Abortion and its Treatment, from the Standpoint of Practical Experience"; and Dr Mary Dixon-Jones, in *New York Medical Record*, July 1894.

will entail frightens her, and she thinks to get out of her trouble by getting rid of the fruit of her womb. A married woman, unfaithful to her absent husband, finds herself open to the same temptation.

2. Those who wish to restrict the number of their children. Married couples who consider that they have already as large a family as they can fitly rear and provide for, and others who have agreed to marry for the sake of mere companionship, or for the gratification of their sexual appetites without reproduction at all, make use of preventive measures of various kinds. When they have failed in their object of preventing conception, such people are ready to cut short the life that has begun to develop against their will, and they furnish a considerable contingent of the cases of criminal abortion.

3. Again, there are women of ample means who shirk the duties of maternity, because the restraints attendant on pregnancy and parturition interfere with their round of society pleasures, or because they wish to avoid what they regard as a disfigurement of their person. These also, when their indulgence in sexual intercourse is followed by a conception which they cannot dance away, will unblushingly seek to have their pregnancy cut short by an early abortion.

II. *The Culprits.*

Who, then, are the people who have a hand in the crime?

1. The only culpable party may be the pregnant woman herself. Wishing to disencumber herself of an undesired pregnancy and its dreaded prospects, a woman will sometimes find means to bring about an abortion, or make attempts, often futile and dangerous, in that direction without letting anyone know.

2. More frequently it is with the consent, often at the instigation, and sometimes at the hands of her husband, lover, or betrayer that she succumbs to the temptation and submits to the dangers of the practice.

3. Then there are the miscreants, male or female, who trade on the unwholesome fears and desires of misguided women, and are prepared to give advice and assistance in the nefarious procedures.

1st. First of all, and probably most numerous, are the women who combine or cover up their abortioning practice with attendance on confinement cases, or keeping private lying-in homes, or baby-farming. They have commonly been trained as general or obstetric nurses, and have acquired a knowledge of the drugs that are regarded as effectual in causing the uterus to expel its contents, or have attained some skill in the use of the local measures that more certainly bring about the result. Tardieu tells (p. 18) of such a woman condemned to penal servitude for life at Grenoble, regarding whom it was proved that in less than three years, thirty-one infants had been dead-born or died soon after birth in her hands, without reckoning the abortions and premature labours which had not been declared. Another *sage-femme*, who was brought before the jury of the Seine, "was known," he says, "by the peculiarly expressive name of *Mère Tiremonde*." Among the objects brought from the properties of such women into the hands of jurists, along with the implements of their trade, carefully kept account-books have sometimes been found with other incriminating articles. Brouardel says magistrates who have had to make investigations into such cases have often expressed astonishment at the modest sum at which women, who have passed through a relatively difficult course of study, are led to commit a deed that destroys their future. "The price of an abortion is generally quite cheap, averaging only about 100 francs," he says.

2nd. Occasionally chemists and other dealers in drugs are so far left to themselves as to supply pregnant women with the means for procuring abortion, when the pretence is made that a remedy is wanted for a pathological amenorrhœa. The *Lancet* did good service in publishing in 1898-9 the result of a series of investigations regarding the dealers in drugs and apparatus really calculated to prevent pregnancy or to bring about its interruption, though ostensibly sold to cure "amenorrhœa," "female obstructions," or "female irregularities."

3rd. Most of all to be reprobated are those members of our profession who sell themselves and degrade their diplomas by prescribing the means or carrying out the measures that secure the death of a developing human being, and who become participators in a crime that has no other object than merely to

suit the convenience or shield the character of a pregnant woman or an accomplice anxious to hide or get rid of the consequences of their sexual indulgence. Such a practice is to be jealously guarded against and distinguished from the procedure which a practitioner sometimes finds himself compelled to undertake, in the interest of a prospective mother whose health or life is compromised in connection with her gestation, when he has recourse to a therapeutic abortion. It is, says Priscian, "as when one lops off a withered branch for the good of the tree, or throws the cargo overboard to save an overladen ship in a storm" (Lewin, p. 19). Teachers of midwifery warn their students to resort to such measures in their practice only in consultation with a brother practitioner. It surely can happen but rarely that two medical men can be found countenancing and aiding one another in an illegal procedure. Yet this is what happened in Paris in 1896 (Brouardel, p. 344). A retired riding-master, a married man, who had got an English dressmaker with child, found a medical friend to take her to a surgeon, specialising in gynecology, to be curetted. The operator, who alleged at his trial that he had not known of the pregnancy, found that he had torn the uterus, and that intestinal coils had escaped through the wound, so that some hours later he opened the abdomen and removed the uterus, with the result that she died within three days. When we read that a young American doctor administered the anæsthetic at the first operation, and that at the second the operator had the assistance of yet another doctor, who may, however, not have known of the criminality in the business, and of an *officier de santé* who habitually assisted the delinquent in a practice that was notoriously of doubtful character, we seem to find justification for the grim pictures presented to us of Dr Gaude and his associates in Zola's *Fécondité*.

III. *The Methods.*

Whilst it becomes us to keep ourselves as practitioners of medicine clear from entanglement in such procedures, it becomes us also to acquaint ourselves with the means and methods that are pursued, if for no other reason than that we may the more readily be able to distinguish between cases o

abortion that have come on naturally or accidentally, and those that have been provoked unnecessarily and unnaturally.

It is in cases of abortion between the third and sixth months that criminal attempts most frequently come to light. This is intelligible if we think of the conditions under which the attempts are made and the methods adopted with the view of cutting short gestation. The woman who has become pregnant outside the physiological limits of reproduction implied in a marriage union of mutual consent and open acknowledgment, or the married woman who has determined that she will have no family or no further increase, is troubled when a menstrual date arrives without a menstrual flow. She fears that conception has taken place. She may hope that the period is only delayed and wait on expecting its appearance. The date fully past, dread begins to haunt her. She tries to provoke it by—

1. *The Use of Drugs.*—For a time she makes free use of powerful purgatives, especially when the next period becomes due; and when her suspicions become more confirmed as this time passes without flow, she begins to dose herself, with or without the connivance of others, with drugs that are reputed to have abortive properties. Many vegetable infusions, extracts, and other preparations have been administered with the object of causing the death of the embryo or fœtus *in utero*, or of stimulating the uterus to expel its contents. Rue, savine, tansy, juniper, yew, cinchona, and especially ergot of rye, have all been regarded as ecbolics, and have been taken with the intention of causing abortion. Except when taken in such large doses as to produce other derangements of the general system, it is doubtful how far any of them, with the exception of ergot of rye, have any direct action on the uterus. Even with regard to ergot, which we can rely on to stimulate the uterus to increased activity during labour, it is of very doubtful efficacy as an agent for starting the expulsive efforts desiderated by the abortionist. The expert who analysed for the *Lancet* the samples of preparations that were procured from dealers professing to sell drugs that would cure female obstructions and amenorrhea found that many of them were quite inert as regarded any action on the uterus.

Preparations of drugs derived from the mineral kingdom

may be more efficacious, but that is only because of their being proportionately more dangerous to the patient. Iodide of potassium, permanganate of potash, borax, arsenic, antimony, mercury, phosphorus, and, above all, lead, have been in use as abortifacients. The cases are not at all uncommon where women working in factories in the Midland Counties of England come under the observation of members of our profession suffering from lead-poisoning, due to the patient having taken diachylum to bring on a miscarriage. The futility of all these administrations is pretty much the same as it was in the days of Ovid ("Heroes," epist. xi., Canacea to Macareus), who makes Canacea tell her brother of the long, weary processes her nurse had made her pass through, with the hope of cutting short an illicit pregnancy: "What varieties of herbs and medicaments did she not bring me! What quantities did she not make me swallow, with criminal object to detach from my bowels the burden that kept growing! Ah, the too vigorous infant knew how to resist all the attempts, and was secure against an enemy from whom he had nothing to fear."

2. *General Mechanical Measures.*—But our supposed gravida, finding her medicines fail her, or by way of supplementing them as the weeks go by, has recourse to various measures of a more mechanical kind that, by producing a shock or jar to the system, may bring about a detachment and expulsion of her ovum. She takes hot baths, plunge- or sitz-baths, takes long walks or rough drives, rides, leaps, dances, applies tight bandages, uses massage, or more rude manipulations of the abdomen. Some have even let themselves fall or leap from dangerous heights with the hope of shaking themselves free. But whilst we all often enough meet with cases where an almost trivial injury will bring on a mishap, for some women have a proclivity to abortion, we may see from time to time cases where pregnant women have been the subject of grave accidents and operations, and yet the pregnancy has gone on undisturbed. So it is with these criminal attempts. Their most brutal efforts may be ineffectual to disturb the pregnancy. A French farmer, wishing to produce abortion in a servant whom he had seduced, set her in front of himself on horseback, and when at full gallop across the fields, threw her on the ground. This he did on several occasions, and, seeing that all had no effect, he

applied to her abdomen loaves burning hot from the oven. She went to term and gave birth to a well-developed child.

3. *Immediate Interference with the Uterus.*—The hot vaginal douche that has been found useful in inducing premature labour has sometimes been employed in pregnancy at earlier stages with criminal intent. More efficacious are the injections that are made directly into the uterus, of water, of soap and water, of quinine wine, of infusions of ergot. Brouardel (p. 161) says some *sages-femmes* use a water coloured white or yellow, to which they give the name of silver or gold water, and charge their victims corresponding prices. He tells (p. 155) of abortionists known as *laveuses*, who use the intra-uterine syringe as if they simply practised a washing out of the uterus with lysol, thymol, or other disinfectants. The instruments employed are probably of the same nature as one which Prüsmann showed at a meeting of the Berlin Obstetrical Society in February of this year,[1] and which could be used by the women themselves who wished to get rid of their pregnancies. They learned to feel the os with the finger of one hand, and with the other hand to push the narrow nozzle through the cervical canal, and so injected into the uterus a solution of lysol. Prüsmann showed the instrument, which he said was on sale ostensibly for the treatment of discharges, because the number of cases of abortion was markedly increased. In the Gynecological Clinic, of the nearly 7000 patients coming for advice, there were from 1500-2000 cases of interruption of pregnancy; in the Obstetrical Clinic, in the last two years, there were respectively out of 3283 cases, 808 abortions, and out of 3188 patients, 951 abortions.

Sometimes efforts are made to puncture the membranes with knitting- or crochet-needles, quills, pen-holders, curtain-rods, umbrella-ribs, or other pointed implements. The more skilled abortionists make use of the better adapted instruments that belong to the equipment of the general practitioner, or even of the specialist in gynecology. These are used either to puncture the ovum or to separate the membranes from the uterine wall or to cause dilatation of the cervical canal and stimulate uterine effort. Thus among the contents of the nurse's bag impounded in the case of the female abortionist in

[1] *Zeitschrift für Geburtshülfe und Gynaekologie*, Bd. liv. Heft 2, 1905.

Edinburgh to whom I referred, along with other incriminating articles, there were found a Prothero Smith uterine sound and a box still containing one or two tupelo tents.

IV. *The Consequences.*

In the great run of cases the object is attained. The uterus is emptied, and organ and patient may come out of the procedure physically unharmed. Often, however, mischief follows. The uterus has been injured and becomes a source of trouble from hypertrophy, displacement, or inflammatory processes which impair the health and comfort of the woman, who may find further on in life when she would fain become a mother, that she has doomed herself to sterility or to recurrence against her will of the abortion she once too willingly induced. In many instances the danger is more acute and immediate. Profuse hæmorrhage may endanger life or debilitate the system. More frequently septic processes are set up from which the patient may barely escape with organs that are permanently damaged, or which may lead, as in Mrs Uzielli's case, to death and detection of the crime. Tardieu and Gallard indicate that a greater mortality attaches to the criminally provoked abortions than to those that come under the care of the regular medical practitioner, although the latter group of patients are already the subjects of some local or general disease which necessitates or leads to the abortion, whilst the former are in perfect health when their pregnancy is attacked. The explanation is sought in the circumstance that the patient suffering from a natural or therapeutic abortion receives all due care and attention ; the woman who has her pregnancy cut short criminally is exposed to further dangers through her anxious efforts to conceal her guilt.

It is pathetic to note that life has sometimes been endangered or even destroyed by women, either spontaneously or at the hand of others, subjecting themselves to abortive procedures when, after all, they had not been pregnant. So it was in the case that led Prüsmann to show the abortion syringe to the Berlin Society. So it seems to have been in the case of one of the three patients in La Pitié that formed the text of Gallard's treatise. I think one of the most tragic stories in all the

literature of medicine is that related by Gaillard Thomas of New York of the wife of a medical man who believed herself to be pregnant and, dreading recurrence of the puerperal fever with which a former pregnancy had been complicated, pushed an umbrella-rib through the vaginal roof along the whole abdominal cavity till, after scratching the liver, it perforated the diaphragm and injured the lung. Dr Thomas was prepared to give her a chance of recovery by opening the abdomen and removing the *corpus delicti*, but was prevented by a relative. At the autopsy the uterus was found to be unimpregnated.

V. *The Essence of the Criminality.*

A procedure that may thus in some cases be attended with disastrous results, whilst in others its consequences seem trivial and transient, what is there in the nature of it that should lead us to regard it as of criminal intent? The cases must be rare where it is carried out with the intention of defrauding some one, as in the history given by Cicero of a woman at Miletus who was condemned to death because the next-of-kin had persuaded her to procure abortion to keep her babe from coming between them and the inheritance. But—

1. Abortion may be regarded as a crime against the State. It is not only that it is an infraction of special statutes. It is opposed to the object and intention of marriage, which is the legal institution for the propagation of the race and the upkeep of the population in a State.

2. It implies danger to the health and even to the life of the mother, and interferes with her fertility.

3. Above all it implies the destruction of a life at whatever stage of pregnancy the attempt is made. The life of the infant, the fœtus, the embryo is ruthlessly sacrificed. Modern science gives no space for metaphysical and juridical discussion as to a date of quickening supervening during the course of pregnancy, as if the developing being became animated so many days or weeks or months after conception took place. It recognises that from the hour that a fertilised ovum was lodged in its uterine nest the woman carried within her a new life that was on the way to develop into a man. As during its intra-uterine existence it is dependent entirely on

the mother, so for a time after birth it is mainly dependent upon her for its continued sustenance. Later, its dependence is on the protection of the paternal roof, and later still on the conditions of the city or country of which it has become a citizen. And from beginning to end it has a claim on the justice of the State for freedom to live and develop. This is the essence of the crime: it destroys a human life. The life, to be sure, was very young and very tender. The more need it had to be sacredly guarded. For it had all the untold possibilities of humanity in prospect. As Lewin (p. 45) rightly maintains, "The human fœtus is an individual in spite of its peculiar manner of existence. The corporeal being of the unborn is subject to the same essential laws of metabolism as in the case of the born, notwithstanding that the mode of nutrition varies. In the fœtus the same kind of tissues are built up for the first time from nutritive material supplied immediately by the mother, which are maintained after birth through constant partial repair by means of nutritive material variously supplied. Its dependence on uterus, placenta, etc., is no contradiction to its own specific life. . . . It has an independent existence, because it has an independent metabolism." The antiquated notions that it only becomes animated at some onward stage of development, or that it may be regarded as a part of the viscera of the mother, give place in science to the idea of its personality. So that, from the point of view of the fœtus, no plea can stand that would mitigate the crime of abortion, as if the life that was cut short was ever at the disposal of the parent, or as if a woman were as free to submit to the removal of a living ovum as to the removal of an enlarging ovary.

It becomes thus very reasonable that jurisprudence should regard the procuring of abortion as a crime, and impose varying degrees of punishment on all who participate directly or indirectly in the deed. And as there are laws bearing upon it in all civilised lands, it becomes especially necessary for the members of our profession to be prepared to track the lines along which the felon moves in seeking to accomplish her or his sinister ends. It is on our evidence largely that guilt can be brought home to the evil-doer, or it is our witness that may shield the innocent.

VI. *The Remedy.*

Now, whilst legislation may set restraints upon evil practices, and justice be prepared to apply the sentence of the law to the criminal, we must acknowledge that the fear of punishment has proved but a feeble deterrent to the commission of this crime. It is of the utmost importance that when such a deed comes to light the transgressor should be seriously condemned, and our laws are none too stern and the administration of them none too severe in this connection. But if the evil is to be lessened, we must look rather to educational than to judicial measures. It comes within the scope of the considerations that bear on a feature of our time that must engage the earnest attention, not of our profession only, but of all who have an interest in the prosperity of the nation—I mean the notable tendency to diminution of the birth-rate, such, *e.g.*, as is shown in Sir Henry Littlejohn's last Annual Report. He gives a table showing that whereas in 1887 the birth-rate in Edinburgh was 30.46 in a thousand, in 1904 it was reduced to 23.42 in the thousand. So marked has this become throughout the nation, that a popular author whose works sell by the thousand has been led to picture *A World without a Child.* Mr Coulson Kernahan goes to the root of the matter when he sermonises thus (p. 51): "In all the world there is no love-light so divine as the light which shines in the eyes of a father, of a mother, at first sight of their child. In all the world there is no sight more sweet, more sacred, more solemn, than the sight of the little child lying sheltered on the bosom of the mother, who, in her turn, seeks loving shelter and shepherding from the strong man against whose protecting breast she leans.

"It is in Fatherhood, in Motherhood, that men and women become likest God, since, in a sense, they are permitted to share with Him the joy and the mystery, the majesty and awe and wonder of creation. For this were they born into the world, born as it were in the purple. When man and woman, youth and maiden, love each other purely and truly, then, be their place high or humble, they become princes and princesses by right of succession and by right of royal birth, then to them comes naturally the voice and the manner of courts; and when

they marry, be their home cottage or be it castle, they shall enter it as prince and princess into a palace.

"But they shall come to higher estate than this. There be they who maintain that love and life are consummated by the coming together in marriage of those who love; but so to speak is to misread the sacred mysteries. Is the means to an end of more moment than the end itself? Is it the scattering of the grain in springtime or the reaping of the ripe corn at harvest which crowns the husbandman's year? When a man becomes a father, a woman a mother, then is he a king and a creator indeed, then is she a queen, and crowned with the rarest diadem that womanhood may wear. It is that men and women may be drawn together in love and marriage, thereby to carry on the work of creation which God himself has begun; that earth may not be lacking in the laughter of little children, nor heaven in the lovely light upon the face of angels, who of their purity may see God—it is for this that God makes women divinely fair, makes men straight and strong and fearless."

It is to the diffusion throughout the community of correct ideas as to the real meaning of marriage that we must look for arrest of the tendency to diminution of the birth-rate. And it is interesting to find that the point of view arrived at by the novelist is attained by the student of evolution, as seen in the article on the "Ethics of Marriage and Divorce," by a member of our profession, in the September number of *The Contemporary*. Dr Woods Hutchison, like Westermark, traces the evolutionary development of man from a group of monogamous apes, and asks, "To what attitude then towards marriage, the marriage of civilisation, monogamy, does our study of its origin and growth bring us? One of profoundest respect and confidence. Its sanctions are just as binding upon evolutionary grounds as upon ecclesiastical or legal. Its universal sway over the minds and hearts of men rests not upon the fiat of any prince, pope, or godlet; but upon its own inherent superiority over every other form of mating, as sternly proved by the experience of millions of past generations, human and pre-human. The right of one man to choose one woman to love and to protect all his life long, of the woman to choose her knight and worshipper, and of both to expect of the other

unswerving faithfulness and comradeship until death do them part, is founded on the life of all the ages.

"Nor is this evolutionary sanction in any sense a low or selfish one. Far from it. It is ennobling and altruistic in the highest degree, for it looks to the benefit not of the individual, but of the race, not of the life that now is, but of that which is to come. Marriage is neither for the pleasure of the man nor the protection of the woman, but for the welfare of the children, and neither of the parties thereto has any individual rights which are entitled to half the consideration of those of the children. No institution, of course, can promote the good of the race and seriously antagonise that of the individuals composing it; and marriage adds enormously to the effectiveness, the dignity, and the pleasure of life, both for husband and wife. Yet to contract a marriage on any of these grounds without giving chief regard to the mental and physical vigour, the sanity, and the efficiency of the probable offspring thereof, is far more profoundly immoral upon biological grounds than upon religious or legal."

The modern novelist and the modern scientist thus alike inculcate the necessity of wholesome marriage ideals for the race and nation that will hold their place or extend their influence among the nations of the world. It has been noted that there is not among Jews the same diminution in the birth-rate that may be found in the cities or people among whom they dwell, and that criminal abortion is rare among their women. This is what might be expected among a people who for centuries enjoyed the highest code of morality, and who read on the first page of their history, as the primal command of their Deity, "Be fruitful and multiply and replenish the earth"; who read on the next page that when doom had fallen, a promise was given that deliverance should come through the woman's seed; and who carried with them through all their changing history the tradition that whilst the father of their tribes was still unborn, his mother had been divinely told that the two boys within her womb were two nations, of whom the elder should serve the younger. In their code of laws it is enacted that (Exodus xxi. 22) "If men strive and hurt a woman with child so that her fruit depart from her, and yet no mischief follow; he shall be surely punished according as the

woman's husband shall lay upon him ; and he shall pay as the judges determine. And if any mischief follow, thou shalt give life for life, eye for eye, tooth for tooth, hand for hand, foot for foot, burning for burning, wound for wound, stripe for stripe." But there is nowhere a suggestion that abortion would be so much as thought of among a people who were trained to anticipate for their progeny a glorious future.

John Trebonius, learned, of agreeable address, something of a poet, and one of the masters in St George's High School in Eisenach, every time that he entered his class-room took off his barret-cap and bowed to his pupils. Poor enough lads many of them were ; among them a miner's son named Martin Luther. Challenged by his colleagues for the unusual courtesy, he replied : " There are among these boys men of whom God will one day make burgomasters, chancellors, learned doctors, and magistrates. Although you do not yet see them with the badges of their dignity, it is right that you should treat them with respect." It is with something of that sentiment that we should welcome into the world the children of the mothers we attend in labour. We may, long ere his birth, have heard the first beatings of the heart of one who will be the hero of an after generation. And no mother could dream of abortion who thought it possible that her child might be a William Wallace to deliver his country from a foreign yoke, or a John Knox to win for his nation the yet higher boon of spiritual freedom, a Robert Burns to sing her songs, or a Walter Scott to tell her stories.

Let no man, above all, let no woman, think lightly of the life that is still at home in a mother's womb, and when it comes to a wider home, let it be welcomed with a song.

When God would give the world He loved a Christmas gift, He gave it a new-born Child.

ON ENDOTHELIOMA OF THE OVARY[1]

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A FEW weeks ago I laid before the Society two tumours of the ovary which were evidently malignant in character, but the exact nature of which was not evident from the clinical history and the naked-eye appearance. Subsequent microscopic examination has shown that they belong to the rare variety of endothelioma ovarii, to which attention has only been directed during recent years. The rarity of the condition and its histological interest are sufficient reason for my making it the subject of a special communication. The clinical features of the case are as follows.

M. F., aged 42, iv-para, was admitted to the Royal Infirmary complaining of pain in the epigastric region which has been present for two years, and a swelling in both iliac regions which she has observed for six months.

About a fortnight after the birth of her last child three years ago she took a severe shivering, accompanied with pain in the epigastrium and vomiting. This was relieved by fomentations and medicine ordered by the doctor, who saw her on the next day. The pain became less severe, but the vomiting continued for about three weeks, at the end of which time she returned to her work. The pain, however, never left her entirely, recurring every two or three days, and lasting for some hours. When it came on she had to go to bed, and was relieved by a profuse perspiration. A year ago she had a recurrence of the severe pain, similar in character to the previous attack, but without vomiting, and since this it has recurred at intervals, rendering her unfit for work. Six months ago she noticed a swelling in the left iliac region, and shortly after this a similar one on the right side. She describes the latter as being as hard as a stone, while that on the left side was softer. Two months ago the pain became more severe and accompanied with vomiting, and about this time she passed blood from the bowels.

There is nothing further in her history worthy of note

[1] Read before the Edinburgh Obstetrical Society, July 12, 1905.

except that the menstruation has not returned since the birth of her last child. Her family history is good.

Examination shows abdominal distension more prominent on the right side, and palpation reveals two tumours of firm consistence, with a nodular surface and freely mobile. They occupy the iliac and lumbar regions, and pass down into the pelvis. Their consistence and well-defined outline suggest a uterine fibroid, but no *souffle* is to be heard; on the other hand there is no distinct evidence of ascites, pointing to a malignant character. Bi-manual examination shows the uterus to the front but not mobile, though the tumours can be moved independently of it. Nodules are felt on the left side of the cervix, and in the right and left lateral fornices, which do not move when the abdominal tumours are moved.

An exploratory incision was made, and on opening the peritoneal cavity two solid tumours were found springing from the ovaries, with a small amount of ascitic fluid. The appearance of the tumours suggested a malignant condition, but as there were no adhesions of consequence, and both tumours were pedunculated, it was decided to remove them. The pedicle of the left was broad and fleshy, but was easily secured by a chain suture in three loops. There were also adhesions of the bowel to the back of the broad ligament in the left side. The right tumour was larger and showed recent adhesions, which were easily separated, but there was some difficulty in securing its broader pedicle. It was tied also in three portions. There was now trouble from bleeding from the left pedicle, necessitating its being ligatured a second time lower down. On removal of the tumours, the peritoneum was seen to be thickened by malignant infiltration.

Patient was very well on being put back to bed, and lay quiet during the afternoon and evening, sleeping at intervals; on the following day she continued well, but unable to pass water, which had to be drawn off by the catheter. She was sick only once. On the third day her condition became far from satisfactory, pulse becoming weaker and faster, 120. In the evening an enema was given, but she passed no flatus, but on the repetition of it she passed flatus and was more comfortable. As there was abdominal distension I examined *per rectum*, and found high up what I had not noticed before, a nodule in the

FIG. 1.—Endothelioma of both Ovaries.

PLATE IV.—TO ILLUSTRATE DR BARBOUR'S PAPER.

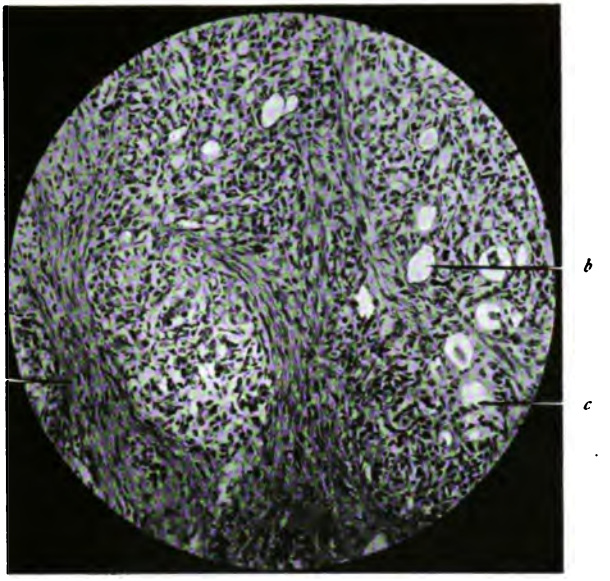

FIG. 2.—Endothelioma of Ovary (× 120).

a, Remains of ovarian stroma pushed aside so as to produce alveoli; *b*, lymphatic with normal endothelium; *c*, endothelium becoming columnar.

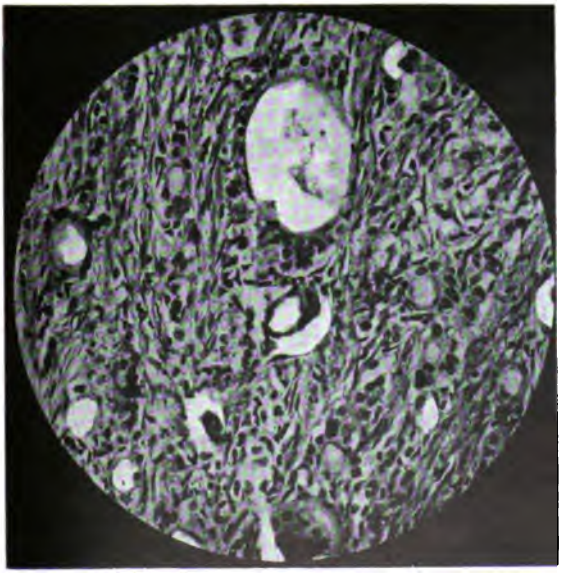

FIG. 3.—Endothelioma of Ovary (× 200).

Note building-up of epithelium in lymphatic at lower edge of section, and its detachment as a collar in middle of section.

PLATE V.—TO ILLUSTRATE DR BARBOUR'S PAPER.

wall of the bowel about the level of the sacral promontory. Her condition became steadily worse. Hypodermics of strychnine and strophanthin were tried, but the pulse would not respond. The temperature varied between 98° and 99°, rising on three occasions to 99.6°, and to 100.6° just before death. Various attempts were made to overcome the paralysis of the bowel, but without much result. The stomach was washed out. Opening the abdomen to ascertain whether there was obstruction or simply paralysis of the bowel was considered, but, owing to the weakness of the patient and the malignant infiltration of the peritoneum, this was deemed undesirable. Twenty-four hours before death she began to vomit, the material having a foul smell. She died on the fifth day after the abdominal section and no post-mortem could be obtained.

Fig. 1 shows the naked-eye appearance of the tumours; and for the photographs showing its microscopic characters I am indebted to Mr Richard Muir, of the Pathological Department of the University, who has also supplied the following description :—

Section No. 1 is taken from the tumour near its surface, and shows the invasion of the stroma of the ovary by the new growth; also dilated lymphatics. No. 2 (× 40) is from a portion of the tumour deeper down, where the ovarian tissue has been entirely replaced by the new growth.

No. 3 (× 120) shows the remains of the ovarian stroma pushed aside by the new growth, which thus comes to have an alveolar arrangement (Fig. 2). In some of the lymphatics the endothelial lining is seen unaltered, while in others it is taking on a columnar form.

No. 4 (× 200) shows similar appearances. In some places there may be seen on one side of a lymphatic space a normal flat endothelial cell, and on the other a columnar cell which is evidently a modified endothelial one.

No. 5 (× 200) shows the building up of columnar cells in the walls of the spaces (Fig. 3). In some spaces the altered epithelium lies as a tubule, like a detached collar, in the lymphatic space. It is difficult to say whether it has been produced from the endothelium at that point, or been carried along from the lymph stream from another point. From the appearance in places it might seem that we had to do with an

adenoma, but the spaces are undoubtedly lymphatic spaces; the tubules have no definite basement membrane such as is found in a cancer.

No. 6 shows a formation of new lymphatics. We have undoubtedly here active endothelial changes, the cells showing mitosis.

Through these microscopic sections we can thus trace step by step the development of the sarcomatous cells from the endothelium of the lymphatics, and we have now to consider the place of this tumour among the sarcomata.

Tumours arising from the connective tissue of the ovary are rare, and in this respect form a striking contrast to the ordinary ovarian cystoma. They are simple (the fibroma and fibro-myoma) or malignant (the sarcoma); to which a third form may be added, the extremely rare angioma. Sarcoma occurs either in the spindle-celled or round-celled forms, the round-celled sarcoma producing a softer tumour, resembling closely medullary cancer. As a rule they spring from the connective tissue of the stroma, as distinct from its blood-vessels or lymphatics: and an interesting origin has been demonstrated by Professor Russell of the Johns Hopkins University, who has shown that it may arise from the theca externa of the Graafian follicle. In a paper in the *Am. Journ. of Obstet.* for 1902,[1] he describes a tumour removed by Dr Kelly, which was diagnosed at the time as an adeno-cystoma of the left ovary, probably carcinomatous, but of which the subsequent microscopic examination showed that it was a sarcoma. The sarcomatous cells surround the Graafian follicle and are apparently developed from the connective tissue capsule of the follicle. In this paper Professor Russell states that statistics based on 1106 cases of malignant tumour of the ovary gathered from 16 different gynæcological cliniques give a frequency of 14 per cent. for sarcomata.

Of recent years a special form of sarcoma has been described under the term of endothelioma, in which the sarcomatous cells are traced to the endothelium of the lymphatics or blood-vessels, hence the term endothelioma. They form a

[1] *Am. Journ. Obstet.*, 1902, vol. ii. p. 182, "An Ovarian Sarcoma developing from the Theca Externa of the Graafian Follicle," by W. W. Russell and R. R. Schenck.

rare sub-class of the sarcomata, how rare it is difficult to say. From the fact that the cells originate from the endothelium, they resemble in character those found in carcinoma, and probably many tumours which have been described as carcinoma of the ovary belong to this class, so that we have as yet no exact data as to their frequency. Glockner, in a recent paper, goes the length of affirming that the diagnosis of endothelioma is not warranted unless primary carcinoma in some other organ has been excluded by a post-mortem.

The first case was described by Leopold so far back as 1874,[1] the next by Marchand[2] in 1879. The first detailed description we owe to a paper by Pick,[3] which appeared in the *Berl. klin. Wochenschrift* for 1894. He describes three types: in the first are seen chains of cells like rose-wreaths running parallel to the fibrous tissue, which on closer examination are seen to be fine tubes filled with lymph or blood corpuscles. These chains communicate with one another, and consist of the proliferating endothelium. The second type shows a cell formation recalling tubular glands with a distinct lumen: it is hard to distinguish from an adenoma or an adeno-carcinoma. While the growth is many-layered and polymorphous, it can be traced to the endothelium. The tubules may be filled with lymph; it sometimes distends them, and these running together may assume a considerable size. The third type shows a sarcomatous structure arranged in alveoli. All these three types may be found in the same tumour.

In the same year Amann's article in the *Archiv für Gynäkologie* appeared, describing five specimens which he laid before the Naturforrscher Versammlung in the previous year, and from them and other recorded cases he made out three varieties: the *perithelioma*, arising from the lymphatics around the blood-vessels; the *endothelioma intravasculare*, arising from the endothelium of the blood-vessel itself; and the *endothelioma lymphaticum*, arising from the endothelium of the lymphatics.

Since Amann's and Pick's papers appeared numerous cases have been published, and the literature up to 1901 is given

[1] "Die soliden Eierstocks Geschwülste," *Arch. f. Gyn.*, 1874, S. 189.

[2] "Zur Kenntniss der Ovarialtumoren," Halle, 1879.

[3] "Zur Kenntniss der sogennanten Endotheliome des Eierstocks," *Berl. klin. Woch.*, 1894, Nos. 45-6.

fully in a paper by Apelt.[1] After a critical examination of the reputed cases, he makes out 45 true cases of endothelioma, 46 with his own. Since his paper appeared I have collected another 23 besides my own; although not having access to the original articles in every case, I am not in a position to say whether they are all true cases of endothelioma. I have added the references, however, to those given by Apelt,[2] so as to make the bibliography as complete as I can up to the present year. Assuming that all these more recent cases are genuine, we have a total of 70 recorded cases.

As regards its clinical peculiarities, Apelt notes that there never was a history of malignant disease of the ovaries in other members of the family, and that while it may occur at any age, 2 of the 45 cases being under 10, and 4 over 60, it was most common between 40 and 50, 11 cases or 29 per cent. occurring in this decade. The next most frequent period is between 20 and 30, and he draws attention to the fact that the same was observed to be the case in ordinary sarcoma of the ovary, according to Zangemeister's statistics. He found this most frequent about the menopause, and next most frequently in the decade from 20 to 30 years. It has associated with it, in some cases, disturbance of menstruation, but this is by no means constant, for in 29 cases in which data are given with regard to this, there were 13 with disorders of menstruation—9 menorrhagia and 4 amenorrhœa. In 2 cases it was associated with pregnancy, and in 3 followed it. In my own case the tumour must probably have begun to grow within a year of the birth of the child, and had amenorrhœa associated with its development.

As a rule it grows fairly rapidly, attaining the size of a child's head in periods varying from one to twelve months. In about one-fourth of the cases (22 per cent.) the condition was bi-lateral, which is about the same frequency as Zangemeister found in ordinary sarcoma.

It is difficult to form an estimate of its malignancy. In some cases it runs a very rapid course. For example, Kottschau records a case in which after removal of the tumour the patient

[1] "Ueber die Endotheliom des Ovariums," *Beitr. z. Geb. u. Gyn.*, Band v. Heft 3.

[2] For bibliography given by Apelt, see *Edin. Obstet. Trans.*, 1904-05.

made a good recovery, but within a month returned with swelling of the abdomen, and after two aspirations died within a fortnight. There may, of course, have been advanced disease of the peritoneum at the time of operation, but that does not come out in his report of the case. Along with this case we may put Lange's, in which the other ovary was left at the time of operation healthy, and at the post-mortem, within six months, was found to be affected in a similar way, with extensive invasion of the peritoneum. My own case belongs to this category. On the other hand, cases have been recorded, such as Graefe's, of non-recurrence many years after operation.

The results of operative treatment are fairly satisfactory. Of 34 cases, 14 sooner or later terminated fatally, 1 at the operation, 7 shortly after it, and the others within eight weeks. Twenty were, however, reported as cured, one after five years. One of Graefe's cases, operated on in 1897, is reported in 1904 as being still well, that is seven years after operation.

In conclusion, I may say that endothelioma has been described in other parts of the generative organs in women besides the ovary. Dr Kelly, in his "Operative Gynæcology," refers to a case which occurred in the cervix, and mentions that not more than five or six cases had been recorded up to that time (1898). In a more recent paper Kirchgessner[1] has collected ten cases from the literature in addition to his own to which Graefe[2] adds another. It has also been described in the body of the uterus by Silberberg,[3] and quite recently in the labium majus by Schmidlechner.[4]

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[1] "Ueber Endothelioma cervicis uteri," *Zeits. f. Geb. u. Gyn.*, Bd. xlix. S. 197.

[2] *Loc. cit.*

[3] "Ein Fall von Endothelioma uteri," *Archiv f. Gyn.* (1903), Bd. lxvii. S. 469.

[4] "Perithelioma labii majoris," *Archiv f. Gyn.* (1904), Bd. lxxiv. Heft 1, S. 195.

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INFLAMMATION AND PERITONITIS CONSIDERED AS PHYSIOLOGICAL PROCESSES[1]

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Surgeon to the Samaritan Free Hospital

MR PRESIDENT AND GENTLEMEN,—My paper is too long to be read in full, and I propose therefore to state only the conclusions at which I have arrived, with a brief outline of the evidence on which they are based.

I originally intended to deal with peritonitis alone, but it became necessary to define inflammation and, in attempting to harmonise the phenomena of this process, as it is usually described, with my own observations, which are chiefly concerned with abdominal surgery, I have been led to suggest some modifications in the most authoritative and widely accepted descriptions of inflammation, whilst I have been confirmed in my opinion that a well-marked peritonitis may be an aseptic condition.

Most of the text-books on Surgery state that inflammation is caused by an irritation of tissue which may be produced by agencies that are living, such as certain pathogenic micro-organisms; or by agencies that are not living, such as thermal, chemical, or mechanical forces.

Beyond this there is often little mention of any inflammatory action except that due to the presence of living irritants, and there seems to be much truth in Professor Adami's assertion that "Surgeons strive to restrict the idea of inflammation to acute pyogenic disturbance."[2] This view is contrary to the teaching of all physiologists, and particularly to that of Lister. It also appears to me to be unsupported by clinical experience.

There seem, however, to be those who hold that when no pathogenic micro-organisms are present in a wound, the changes taking place are physiological and therefore *not* inflammatory, and that when such micro-organisms are present the effects produced are pathological *and* inflammatory. There can be no doubt that the healing by first intention of any

[1] An abstract of a paper read at the Royal Medical and Chirurgical Society of London, October 24, 1905.

[2] "Allbutt's System of Medicine," vol. i. p. 120.

wound is a physiological, that is to say, a natural process, but I hope to show that the suppuration occurring on account of septic contamination is an equally natural consequence of the abnormal conditions to which the tissues are exposed. The kind and the degree of irritation differ when a septic element is introduced, and the effects on the system vary also, but the changes brought about are in all cases natural, that is, physiological consequences of definite exciting causes, and, whenever it is possible, these changes lead to a repair of the damage done.

In the slighter degrees of inflammation, studied by Lister and others, as they were seen in transparent membranes such as the web of the frog's foot, when the injury was not so great as to destroy the tissues, it was noted that the vessels in and around the irritated part become dilated, but that the blood flow was arrested in the most damaged area, the corpuscles becoming glutinous and adhering to each other and to the walls of the vessels.

Lister attributed this arrest of the circulation to a diminished vitality of the blood corpuscles arising from their contact with the damaged tissues. It was said that owing to their lowered vitality they adhered to the walls of the vessels as they adhered to each other outside the body, and that they remained thus until they and the adjoining tissues regained their full vitality by virtue of an inherent power of recovery which they possessed. This view assumes, however, the existence of two actions which appear to be somewhat inconsistent with each other, namely an inherent power of recovery and a power of influencing adjacent structures harmfully. If a partially devitalised tissue has a damaging effect on adjacent structures, it seems to be necessary that some principle, other than an inherent power of recovery, should exist to arrest the destructive process and to prevent its indefinite extension. It might be suggested that the injury to adjacent parts diminishes as it extends, and so has only a limited range of action. But, again, it is difficult to explain how the nourishment of the central part of the damaged area is carried on if stasis is due to diminished vitality of the blood. An inherent power of recovery is not likely to be effectual in reviving tissues deprived of their blood supply, and therefore of their nourishment, because the arrest of the supply

of proper nutriment to a part is in itself a cause of death of tissue.

When living structures are damaged, all we know of them would lead us to believe that they require more nourishment than usual and that metabolism must become more active both as regards the disintegration and as regards the building up of cells, and of more complicated tissues, if recovery is to take place without loss of substance.

It was noted, however, that when stasis occurred, the white blood corpuscles were affected more rapidly and to a greater degree than the red. These white cells were observed also to pass from the capillaries into the interstices of neighbouring parts.

This latter observation showed that the white blood cells retained active properties, although their flow through the vessels was arrested, and it seems to me that the significance of the fact that the arrest of the blood flow through a damaged area does not destroy the activity of the white blood cells has not been fully appreciated. Moreover, so far as I know, the great importance, in connection with aseptic inflammatory changes, of more recent discoveries regarding the functions of the white blood cells has not been pointed out.

In Landois and Stirling's "Physiology" it is asserted that the white blood cells possess a property called chemotaxis by which they have the power of being attracted by certain substances and repelled by others, and it has long been stated that these cells are drawn by this peculiarity of their constitution towards schizomycetes and other micro-organisms introduced into the tissues. It has also been shown that in some natural processes, as in the shedding of the tail of the tadpole, certain large white cells exercise a devouring function, eating up and removing waste products, even in masses large enough to be visible under the microscope.

Thus it would appear that one of the functions of the leucocytes is to carry away effete matter from the tissues and, with the blood plasma and red cells, to convey abundant pabulum to build up their substance again, and these changes must be carried on more rapidly than usual in a damaged area.

The dilatation of the neighbouring vessels permits the access

of large quantities of blood to the parts, and the exudation of serous fluid which certainly occurs must greatly facilitate the movements of the white cells. Moreover, it has been shown that if a drop of blood from a warm-blooded animal is put under a microscope and kept at the temperature of the body, the white blood corpuscles retain their power of movement for between two and three hours. They would maintain their active properties at least as long in the living body. Again, if their chemotaxic properties attract the leucocytes to a damaged part in order, as I assume, that they may eat up and remove waste products and convey nourishment to the tissues, it follows that when the individual white cell or phagocyte has become full of products of metabolism, or has given up all its nutriment, these same chemotaxic properties which attracted it will then have an opposite effect, by which the leucocyte will be impelled to leave the inflamed area, making way for others, and to pass again into a vessel, but this time into a lymphatic. I suggest that the white cells seek and devour and then leave an excess of used-up material, exactly as the amœbæ, which they so closely resemble in appearance, seek and leave their food by instincts which we are not able fully to explain. We cannot, of course, assert or suggest that the white blood cells have instincts, but it has long been supposed that they act as if they had with regard to pathogenic micro-organisms, and I venture to put forward the view that it is the same property that collects them together in irritated tissues, although no septic organisms are present.

According to this view, numerous white cells, impelled by their chemotaxic properties, would enter and leave an inflamed area, exercising their functions with very great and unusual activity until the parts return to a normal condition. This seems to me a more rational explanation of the phenomena observed, and more in accordance with certain clinical facts to which I shall refer, than that by which it is supposed that the blood is arrested, because it has its vitality diminished by contact with injured tissues.

There can, I think, be no doubt that an active exchange of products between the blood and the lymph on the one hand and the injured tissues on the other must continue, even in severe inflammatory conditions, if recovery is to take place.

If the supplies of nutritive material were arrested, the tissues would die, and it is difficult to understand how even the normal amount of nourishment could be conveyed to the parts if stasis were caused by a lowering of the vitality of the blood in the affected area.

Although inflammation is an exudative process, a clear distinction should be drawn between, on the one hand, the exudation of serous fluids and of leucocytes into the tissues or on to a raw surface; and on the other hand, that exudation which is mechanically produced by the opening of blood-vessels and lymphatics when the tissues are divided by a knife or accidentally. In natural conditions the great bulk of this latter exudation is usually lost to the body, but under special circumstances, and when the surgeon stitches up a wound, these discharges may be retained, and if thus enclosed in too great amount they may be harmful; whereas the exudation into the interstices of the tissues brought about by an injury is a necessary result of the irritation, and has always a beneficial tendency. When it occurs in excess, it is because the irritation is very severe or is too long continued.

The Merging of Inflammatory into Natural Processes.

If the inflammatory process consists of the physiological changes necessary to remove effete matters, which are developed in unusual amount because of a localised irritation and diminution of vitality in the tissues, it is clear that an injury to one cell, or to a hundred cells adjacent to each other, or to any number of cells, must produce changes of exactly the same kind, varying, if the circumstances be otherwise the same, chiefly or perhaps only in degree.

Hence it is a very difficult task to define the beginnings of inflammation, and indeed these must merge insensibly into natural processes. In a paper on the "Fate of the Ovum and Graafian Follicle in Premenstrual Life," Dr Thomas G. Stevens[1] showed that the ovum and follicle are removed by a phagocytic action and a formation of cicatricial tissue; and Metchnikoff first observed and described phagocytosis from a study of the changes by which the tadpole loses its tail. Again, in the

[1] *Obstetrical Society's Transactions*, vol. xlv.

sloughing of the umbilical cord on the abdomen of the newly born mammal, there is a natural process which cannot clinically be distinguished from that of healing under a scab, and which in all probability involves some degree of phagocytic action as the parts separate.

The absorption of the ovum and follicle and the casting of the tadpole's tail and of the umbilical cord are all physiological processes, and the differences between the changes connected with these physiological actions and those following an injury seem to me to be imperceptible.

When, in adult life, the Graafian follicle ruptures, there is necessarily a solution of continuity in the tissues, and the effects produced at the point of rupture must be very similar to those caused by any other irritation of tissue. In fact, although it is a physiological process, the rupture of a follicle involves the infliction of an injury, and the separated tissues must unite by exactly the same processes which take place during the union of every aseptic wound, whilst they are also practically the same as those by which the follicle is transformed into a scar either before or after menstrual life begins, although under certain circumstances cicatrization of a follicle is much delayed.

The thrusting of a clean needle into the tissues can hardly produce more mischief than the rupture of a Graafian follicle, and the processes of healing seem to be the same in the two cases, so that they must be physiological in both.

It might here be suggested that, as inflammation was long regarded as a disease of a damaging nature, if it is to be considered as a physiological process it would be well to retain the word inflammation for the destructive action which is generally effected by the presence of micro-organisms in the tissues. This view seems to be very generally adopted, and indeed the idea that something gross and obvious must be produced before we can recognise inflammation appears to be the foundation of Professor Adami's criticism, that "Surgeons strive to restrict the idea of inflammation to acute pyogenic disturbance." But I hope to show that inflammatory changes, although they merge insensibly into natural processes, may also give rise to very acute symptoms which are not necessarily associated with putrefactive changes.

A short incision causes hardly greater evidences of mischief than the puncture of a needle does, and union invariably takes place under favourable circumstances. But a short incision over a joint, if the joint is used too soon, becomes red, painful, and obviously inflamed, even although the adhesions between the opposed surfaces do not break down. The evidences of inflammation at once subside if the joint is again kept quite still in a favourable position. There is no proof that these signs of irritation are brought about by micro-organisms. To say that micro-organisms must exist in the affected tissues because signs of inflammation develop is to beg the whole question.

When a large wound is made, such as that for the removal of a breast, although all goes well and although the temperature and pulse do not rise, there are signs, in the shape of free perspiration, thirst, and concentrated urine, that excessive tissue changes take place throughout the body. These excessive changes are, under the circumstances, evidences of febrile reaction, for, according to Dr Donald MacAlister, "high temperature is not necessarily fever, and fever is not necessarily accompanied by high temperature. . . . It is the excessive thermogenesis with the excessive catabolism of nitrogenous tissue which that involves that constitutes fever."[1] Moreover, in a very large number of cases of major operations a slight rise of temperature, although it may be a very slight rise indeed, can be detected if careful records are kept, and this evidence of febrile reaction was more marked when strong antiseptic, but irritating lotions were freely applied to raw surfaces.

Peritonitis.

Before discussing the origin of the excessive metabolism of the tissues generally which accompanies extensive injuries, it will be convenient to consider some of the phenomena of inflammation as they appear in the peritoneum.

It has been said that "peritonitis for all practical purposes may be defined as an inflammation of the peritoneum caused by bacteria and their products,[2] and Sir Frederick

[1] Dr Donald MacAlister, Gulstoniam Lectures, 1887.

[2] "International Text-book on Surgery," by Mr Pearce Gould and Dr Collings Warren, 1902, vol. ii. p. 334.

Treves wrote that "a consideration of the whole matter leads to the conclusion that the production of peritonitis by non-infective irritants has not yet been satisfactorily proved."[1]

In publishing this opinion, Sir Frederick Treves referred to me as holding other views, and I still believe that a non-inflammatory peritonitis not only exists, but is a common occurrence, the results of which may be seen daily. The phenomena following acute torsion of an ovarian tumour exhibit all the evidences of inflammation and none of those of bacterial infection. There is pain with a marked rise of pulse and temperature, the latter being often as high as 102° or 103° F. After three or four days, if the abdomen is opened, a dark-blue strangulated tumour is seen, covered everywhere by fine recent adhesions; but if the abdomen is not opened at this time, when a few days more have elapsed inflammatory symptoms subside, and if the growth is removed some weeks later it has a quite natural appearance, the only change consequent on its torsion being that its blood supply comes from an abnormal source through the adhesions.

The evidences of inflammation are obvious, and, although septic mischief occasionally develops, yet in the great majority of cases there is no sign of bacterial infection, and the inflammation is strictly localised in the peritoneum covering the tumour and in that touching it. There is no resemblance to a septic inflammation.

Whenever we open an abdomen that has been opened before we are liable to meet with adhesions, which are generally, and I think properly, described as inflammatory; but if a patient recovered from an abdominal operation without any adverse symptoms, and possibly with the smallest amount of reaction, it would not be remarkable, if the peritoneum were again exposed, to find an adhesion binding the omentum to the back of the abdominal incision. This is a result of inflammation, but there is no evidence of the action of bacteria in its production. Such adhesions form immediately after the first operation, or they do not form at all as a consequence of it. It is true that they are often of no practical importance, but they may be the immediate and direct cause of death within a

[1] *Med. Soc. Trans.*, vol. xvii. p. 156.

few days of the operation, or by bringing about a strangulation of intestine, perhaps many years later.

Similarly, when an extra-uterine fœtation bursts, a large quantity of blood or a fœtus of advanced development may escape into the peritoneal cavity, and the same evidences of inflammation as are found when a pedicle becomes twisted may follow, but such patients frequently recover without showing any signs of septic mischief, except, of course, to those who maintain that a febrile condition must be septic. A dead fœtus of advanced development would certainly seem to offer sufficient pabulum for the increase and multiplication of germs if they gained access to it, but such a fœtus may cause an inflammatory attack, and may afterwards remain for many years as a lithopædion within the abdomen without causing harm. Dr F. W. N. Haultain has put on record 10 cases in which such a condition continued over 40 years.[1]

Ovarian tumours may also contract adhesions to adjoining tissues from many causes other than torsion of their pedicles. In one case in particular I remember taking an ovarian cystoma out of very dense adhesions which everywhere surrounded it, and finding its surface covered with numerous spicules of bony material, the growth being a dermoid. There had been very little pain or disturbance of any kind connected with the development of this growth, and I cannot believe that the chronic peritonitis which had evidently existed was due to micro-organisms when the tumour itself, if adhesions had not formed, would have been rough enough to injure a delicate skin.

Some Peculiarities which may be observed in Serous Inflammations.

There is a peculiarity about some peritoneal inflammations, especially that caused by the twisting of an ovarian pedicle, namely that there is no raw tissue, and the acute inflammatory process, which is certainly set up, terminates rapidly in union of the surface of the tumour to all the adjacent peritoneum. In this case an exudation of leucocytes and lymph must take place before adhesions can form. But the conditions arising

[1] *Journal of Obstet. and Gynæcol. of the Brit. Empire*, Oct. 1904.

when the pedicle of a tumour becomes twisted, exactly resemble those of union by first intention in an ordinary incision, and therefore it may be argued that in a flesh wound also exudation must precede union.

It is to be noted that whatever the exact nature of the irritation may be in the case of a tumour with a tightly twisted pedicle, there is no doubt that a well-marked inflammation is produced, and that the result is not merely a union of surfaces, but this form of inflammation terminates in the revivifying of a mass of dying tissue, an effect which is of the utmost importance, and must be carefully considered, in formulating our views on the nature of the inflammatory process. There is in this particular instance of inflammatory action no destructive function, and certainly no impaired function. On the contrary, a very active process of constructive development obviously takes place. It is certain that the leucocytes are thrown into the peritoneal cavity for the purpose of forming vascular channels by which the tumour may be revived and nourished. Hence, unless the inflammatory process is capable of variation in its essential nature, the conditions observed in cases of acute torsion of the pedicle of an ovarian tumour afford a proof that the phenomena of stasis are produced with a view to reviving the tissues, as I have suggested in the earlier pages of this paper, and not in consequence of an impairment of vitality in the blood-cells. I am therefore unable to agree with Mr W. Watson Cheyne and Mr F. F. Burghard when they make a "destructive character" an essential feature of their definition of inflammation,[1] or with Mr A. Pearce Gould and Dr T. Collins Warren when they describe inflammation as "a lesion in the mechanism of nutrition, owing to which its efficiency is impaired."[2] Moreover, in this case it is impossible to separate the phenomena of inflammation from those of repair. As Lister said, "a certain amount of inflammation, as caused by direct irritation, is essential to primary union." Inflammation is, in fact, a part of the initial stage of repair, whenever the latter process is necessitated by any kind of injury. It is characterised by an excessive action of the same kind that brings about repair in all normal processes of decay. Inflam-

[1] "Manual of Surgical Treatment," part i. p. 1.

[2] "International Text-book in Surgery," 1902, vol. i. p. 45.

mation does not, however, continue through the whole process of repair of an injury, but only until all dying tissue has been revived or cast out of the body.

It seems to me that in all the cases of union by first intention which I have considered, namely, the rupture of the Graafian follicle, small aseptic injuries, large aseptic injuries, and onwards to extensive aseptic peritoneal inflammations, the same changes take place, the tissues doing everything possible to aid in removing effete matters and in reviving damaged parts. The extent of the local mischief naturally varies with the amount of tissue involved, but the effects on the general system also vary from those that are imperceptible and hardly exist to a well-marked inflammatory reaction with the temperature rising to between 102° and 104° F.

Septic Inflammation.

Clinically and pathologically it is impossible to draw a definite line between aseptic and septic inflammations. As Professor Adami said, "the various forms of inflammation merge insensibly one into the other."[1] Under circumstances which are at all favourable, an ordinary aseptic flesh wound heals with certainty, but the tissues can absorb and destroy a variable amount of some pathogenic micro-organisms, so that union may not be interfered with by their presence, and it may not be possible to say in an individual case whether such an absorption has taken place or not. In such cases, as I have said, the phenomena of inflammation and those of repair are practically carried out simultaneously and by the same agencies. But certain micro-organisms, if present in sufficient quantity, prevent primary union and may endanger the patient's life. Our knowledge of pathogenic micro-organisms is still incomplete, but we know that their effects vary widely. Some, such as those that cause tuberculosis and those that cause the specific fevers, may gain access to the body without any obvious breach of continuity of the surface. In some cases, however, and certainly as regards the bacilli of tuberculosis, and also as regards the germs of all fevers which confer immunity from a second attack, the condition of the tissues affects the power of the invading force.

[1] "Allbutt's System of Medicine," vol. i. p. 128.

Other poisons like those of hydrophobia and those of tetanus may produce characteristic and well-marked symptoms without exciting any signs in the wounds through which they are introduced.

Yet another class has the power of directly irritating the tissues. The effects may be entirely local, as when an abscess forms and enlarges but heals at once when it is evacuated. In other cases the micro-organisms tend to spread along lymphatics and to produce fresh foci of infection near at hand or in distant glands. Moreover, it would seem that sometimes, owing to special circumstances as regards the condition and position of the tissues and the virulence of the poison, the same organism may produce either a local or a spreading inflammation.

From the point of view of the surgeon, the simplest form of septic irritation is that which produces suppuration and prevents union in a wound, but which does not spread to other tissues except by direct extension. This is the kind of inflammation which produces the pus that used to be called "laudable." It is the only form of septic mischief that I propose to consider in this paper.

When micro-organisms are introduced into a wound in such numbers that the leucocytes are not able to absorb the effete matter of the cells damaged by the injury, and to absorb and destroy the micro-organisms also, a great effort is made to produce sufficient cells for the work required. Leucocytes are thrown into the tissues of the affected area in increasing numbers, and a suppurating surface either in the shape of an abscess wall or of an open wound is produced. Landois said that "if colonies of staphylococcus (bacteria of suppuration) collect at a given part of the body, their metabolic products attract the leucocytes from the neighbouring vessels, and in this way inflammatory reaction and suppuration result."[1] This attraction of the leucocytes was attributed by Landois to the quality of chemotaxis possessed by them. But we have seen, and Landois stated, that leucocytes collect in a part which is subjected to any irritation, although the latter be not septic in nature.

According to the view I have put forward, it seems obvious that when, in addition to the irritation of an injury, that of the

[1] Landois and Stirling's "Physiology," p. 47.

staphylococci is added in sufficient intensity to induce pus formation, the reaction on the part of the tissues is of exactly the same kind as that which takes place when union occurs by first intention, although it differs in degree and in results. Thus pus formation also may be traced to physiological causes stimulated to excessive action. The results achieved are less perfect than in the case of a simple resolution, or of a union by first intention, because it is necessary to throw out of the body, either into an abscess cavity or on to a free surface, the irritating micro-organisms and the débris of damaged cells which the tissues are unable to absorb and assimilate. With these, many leucocytes are also lost. This throwing off of the irritating and effete material is simply a reversion to the methods of the lowest forms of animal life, which normally extrude or crawl away from any irritating matter or remains of food which they are unable to make use of. The method is typically exhibited in the case of the amœba, and it is interesting to note that in man the extrusion of irritating matter from the body is largely accomplished by means of the leucocytes, which closely resemble amœbæ in their appearance and movements.

Distensile pressure within an abscess is the chief cause of its enlargement. The part of its wall furthest from the centre merges into healthy structures, but the tissues become progressively more abnormal towards the inner surface, near which the pressure is so great that the leucocytes cannot reach and overcome the bacilli, and as the pus collects the radius becomes greater within which the healing powers are ineffective. Thus the abscess extends. If, however, the pus is evacuated so that the pressure is removed, the vessels in the wall of the abscess dilate so as to re-admit the blood, the leucocytes quickly destroy the micro-organisms and revive the structures forming the abscess wall so that healing becomes possible. The processes of repair are in this case prolonged beyond those of inflammation. The latter cease when all dying tissue has been revived or physiologically separated. In case a gap occurs in the tissues, union can of course only be completed slowly.

During the development of a suppurating process a greatly increased number of white blood cells is produced, their

increased formation being probably stimulated by the excessive loss in the form of pus. But the production is generally in excess of the loss, and thus the phenomena of leucocytosis are brought about.

Septic Peritonitis.

Septic peritonitis may arise in three ways: (1) from infection by noxious germs circulating in the blood; (2) from extension of septic irritation in adjoining tissues; (3) from direct introduction of noxious material into the peritoneal cavity.

In this paper I propose to deal only with the last of these methods of access of septic mischief to the peritoneum, but I hope on a future occasion to show that the phenomena of infection through the first and second of these channels are not inconsistent with the views now advocated.

I have more than once pointed out that the word peritonitis is very indefinite, as commonly used, and that it is desirable that the position and character of an inflammation of this membrane should always be defined.

When a septic peritonitis is started by some poison introduced through a wound, the conditions are in every detail comparable to those arising under similar circumstances in a superficial flesh wound, with these differences, however, that the extent of the surface exposed to infection is larger than that of any ordinary wound, consequently the area for absorption of poisonous material is very great, and moreover a general septic peritonitis invariably gives rise to paralysis of the intestine, which is a very serious complication.

With these peculiarities, all the gradations between union by first intention and a general suppuration of the whole surface of a flesh wound may be exhibited in the peritoneal cavity. Union by first intention is typically exemplified in the conditions following the twisting of the pedicle of an ovarian tumour, and in the adhesions which may form without symptoms after any abdominal section. All the other grades from a small pocket of pus in connection with a septic ligature or other septic focus, to a general suppuration of the whole peritoneum, may be observed.

The Effects of an Inflammation on the Rest of the Body.

After extensive operations, however satisfactory the progress of recovery may be, there is invariably free perspiration, considerable thirst, and a concentration of the urine. Moreover, if careful records are made, a rise of temperature, although perhaps it may be only a very slight rise, perhaps only to 99° F., is almost invariably noted. These are signs of the increased tissue changes which Dr Donald MacAlister described as febrile.

Moreover, when strong chemical solutions were freely applied to raw surfaces the evidences of inflammatory reaction were more marked and more certain to occur than they are now, when heat is so largely used as a sterilising agent and when every care is taken to reduce irritation of the tissues as much as possible.

The improved treatment has been described as a "method" and has been called the "aseptic" method, an unfortunate name, I think, for there is nothing in recent changes that is directed to obtaining a greater degree of asepsis than was aimed at by the antiseptic method which Lister described as consisting of "such management of a surgical case as shall effectually prevent the occurrence of putrefaction in the part concerned."[1] No method can achieve a greater degree of asepsis than this, and our most recent improvements of technique would have been better distinguished as anoxic (non-irritating), but still antiseptic, for the reduction of irritation is their characteristic feature rather than an increase of asepticity.

I have pointed out that the effects of an aseptic inflammation vary with the extent of the area of irritation. In the same way a suppurating inflammation, which is not associated with a spreading of mischief along the lymphatics, which, in fact, gives rise to a strictly localised abscess, also induces febrile reaction in proportion to the extent of tissue involved. An abscess in a hair follicle may cause an intense local inflammation without any obvious disturbance of the system generally. Similarly a minute stitch hole abscess causes little general disturbance, but a large one may induce a definite reaction. An abscess connected with the appendix or in the

[1] Introductory Lecture, University of Edinburgh, 1869.

ischio-rectal fossa may be strictly localised, but generally causes a very considerable fever. A septic injury of a healthy knee-joint also causes much inflammation and febrile reaction, but recovery may be rapid and complete. Of course every septic wound causes more disturbance than an aseptic wound of the same size, and the intensity of the septic poison may make a comparatively great disturbance although a very small area is directly affected; but speaking generally, a wound in which septic action is localised causes a degree of general disturbance proportionate to its extent.

The Causes of Increased Temperature.

It is usually held that fever is caused by absorption into the tissues of poisonous material which is produced by micro-organisms. There is, however, one form of fever, that due to fractures, in which it is believed that micro-organisms are not concerned, and in which it has been assumed that "a hypothetic substance, pyrogen,"[1] is produced. It is supposed that the substances, real or hypothetic, which when circulating in the blood cause fever, do so by acting on the heat centre. But *how* they act has not, I think, been explained.

Moreover, the substances under discussion are for the most part irritant to the tissues, and it is more than likely that every substance so acting, even blood transfused from another specimen of the same species, is thus irritant. But the suggestion that these substances cause fever by acting on a heat centre leaves out of account the fact that they may, and I think must, cause an irritation of tissue throughout the body.

The following clinical facts seem to be important in this connection. Micro-organisms and their products circulating in the blood are certainly causes of fever, but in the case of a surgical wound the immediate exudation of blood and lymph is for the most part discharged and lost to the body. When it is penned up by natural conditions or by the surgeon's sutures a considerable amount may be absorbed.

When, however, it is not all removed, fever is apt to run high; the more rapidly it is taken into the tissues, the less obvious is the febrile reaction. The evidence that the absorp-

[1] Victor Horsley, "Heath's Dictionary of Surgery," vol. ii. pp. 367, 368.

tion of foreign matter causes fever is not supported by this consideration. Again, when the exudation into the interstices of the tissues resulting from their irritation is in great excess, and fever runs high, the cause is really due to the fact that the leucocytes are *not* able to absorb promptly the effete matter and the irritating foreign bodies that must be taken into the circulation and destroyed, if union by first intention is to take place.

All the evidence seems to me to show that when matters are absorbed into the circulation from wounds which heal by first intention and without further complication, any irritating properties these matters may have possessed are removed by the action of the leucocytes ; and that it is when they are *not* absorbed, or being absorbed are not assimilated, and therefore remain locally irritating, wherever they happen to be, that they bring about an increase of febrile reaction.

It is very important to draw a distinction between an absorption of micro-organisms, the vitality of which is not destroyed, and which therefore act as irritants wherever they go, and an absorption which involves a digestion and assimilation of the material taken up.

To return to the case of an ovarian tumour with a twisted pedicle, the only communication between it and the rest of the body, after torsion becomes acute, is either through a pedicle, which must be narrow, and the circulation through which is completely arrested, or it is from peritoneum to peritoneum. It is very difficult to understand how absorption to any extent at all can take place until a fresh vascular connection is established between the tumour and the adjacent parts. But it is whilst the channels for a fresh blood supply are forming that the temperature rises, and when a fresh communication between the tumour and the sound tissues has become established the temperature falls.

At this time it is certain that effete products must be absorbed in large quantity, for, between the time when the pedicle twists and the time when a fresh connection between the tumour and the tissues adjacent to it is established, the growth must certainly be undergoing a process of death from starvation, and therefore much effete matter must collect in it. These products of degeneration arise, however, from ordinary

processes of decay, and are therefore in a form in which they are easily assimilable, when channels for their removal are established.

It has been pointed out that the temperature is usually raised for a somewhat longer period in cases of twisted ovarian pedicle than it is during a febrile reaction caused by an uncomplicated flesh wound, and this has been supposed to indicate that a septic infection is produced. This prolonged fever is, however, fully accounted for by the fact that it is impossible to keep the intestines absolutely at rest, and their movements must disturb the recently formed adhesions, and so prolong the febrile reaction exactly as obvious signs of inflammation are produced in a wound over a joint if movement is begun too soon. These considerations also suggest that an exudation into the tissues, rather than an absorption from them, is associated with febrile reaction.

It seems to me that a better explanation of the origin of fever may be found than that which attributes it to a direct irritation of the heat centre.

The temperature of the body is remarkably steady in health, and every condition that tends to disturb it is immediately met by automatic changes, bringing it back to the normal. There can be no doubt that if a cell, or group of cells, or a complex tissue has its temperature lowered by any cause, the change induces a quicker heat development or a smaller amount of heat loss, so that the body temperature is not altered. If, then, a number of cells are in process of dying, or in a condition of diminished vitality from the infliction of an injury, they must tend to become physiologically cold, to approach the coldness of death, and it is to be expected that this condition would induce greatly increased tissue changes, with a view to the compensatory development of more heat. As long as the heat centre retained full control, an excessive metabolism of tissue would occur without a rise of temperature, and there would be a condition which was described by Dr Donald MacAlister as a *febris sine febre*. But if the stimulus to increased formation of heat were too great the temperature would rise, perhaps a little, perhaps high enough to induce death.

Certain clinical facts support the view that a local coldness

of tissue is the cause of fever. The initial rigor which ushers in so many acute inflammatory conditions simulates exactly the effects of intense cold on the healthy body. The chilly stage of ague also closely resembles the condition of a rigor and the effects of cold.

Clinical evidence is also in favour of the theory that a febrile reaction, caused by an injury, and increasing in severity for from two to three days, may be attributed to local conditions. The question whether a wound will unite without suppuration or will break down is almost always settled in about this time. The formation of a slough from inflammatory reaction is also generally determined in not more than three days. Moreover, there can be no doubt that the nearer an inflamed tissue approaches to actual death the higher the temperature rises, and it is when the dead part becomes marked off that the temperature falls. Dead tissue in the body does not necessarily induce fever, but a dying of tissue, accompanied by inflammation, always does.

Thus a rise of temperature may be explained as a reflex effect of lowered vitality of the tissues acting on a nervous mechanism which is known to exist. Exactly the same mechanism must, however, be brought into play by a wide-spread effect of irritants circulating in the blood, as when septic absorption takes place from a wound and in the eruptive fevers —although some of the latter have definite local inflammatory lesions, the development of which is closely associated with the febrile manifestations. It seems to me more rational to attribute fever to an effect of a slight general irritation of tissue, acting reflexly on the nervous system in the manner I have indicated, than to assume that these irritants act in some quite unexplained way directly on a heat centre ; and further to assume that their irritating effects on the tissues generally have no results at all as regards an alteration of temperature, or that they directly induce increased metabolism.

If the views which I have put forward are correct, fever, like inflammation, is a physiological process. The phenomena characteristic of it, although not always perceptible and sometimes hardly existing, must nevertheless be produced by the smallest and cleanest incision and by the presence of minute quantities of irritants circulating in the tissues, as well as by

the most extensive injuries and the absorption of full doses of septic material. In fact, the phenomena of fever, like those of inflammation, whether resolution, suppuration, or sloughing, or death of the whole body takes place, may all be traced to physiological processes acting in excess, and the ordinary effects of which are fairly well known and understood. They merge on the one hand into healthy action, and on the other into conditions incompatible with a continuance of life.

The view that a conflict between the cells of the body and invading bacteria resembles a battle, and that this conflict "is a representation of the inflammatory process,"[1] seems to me to be apt but incomplete. Much damage may be done to, and much excitement may be created in, a country without its invasion by a single soldier. Injuries thus inflicted, as by the bombardment of a seaport town, represent an aseptic inflammation. An earthquake or the eruption of a volcano may slay thousands and may extinguish towns and even countries without human agency, and such catastrophes may well represent the effects of acute torsion of the pedicle of an ovarian tumour.

These comparisons also illustrate very well how the results of injuries vary with the extent of the mischief. A bombardment of a seaport town might produce practically no damage and little excitement, and of course the effects of an invasion vary with the number and character of the invaders, whilst those of an earthquake are obviously directly proportionate to the extent of country involved and to the severity of the seismic convulsion.

In conclusion, it seems to me (*a*) that an obvious and definite aseptic peritonitis is a not uncommon condition; (*b*) that aseptic inflammation may be described as consisting of the local physiological changes in and around damaged tissues which are brought about by an injury, and which increase in activity for not more than three days after the injurious action ceases—the object of this increased physiological activity being the removal by absorption, without obvious loss of tissue, or the demarcation, with a view to separation, of those parts which have been so damaged that their period of usefulness to the animal economy has ended—but

[1] Sir Frederick Treves, *Med. Soc. Trans.*, vol. xvii. pp. 126, 127.

the result in some cases being a revival of tissues which have been deprived of their blood-supply; (*c*) that septic inflammation may be described as consisting of the local physiological changes in and around damaged parts which are brought about by an injury and by the presence of irritating micro-organisms acting on the damaged and adjacent tissues, or which are brought about by the action of such micro-organisms on undamaged tissues—these changes continuing and varying in activity in proportion to the duration and intensity of the irritation—their objects, which are not always attained, being the removal by absorption or by extrusion of the noxious micro-organisms, and the removal by absorption, without obvious loss of tissue, or the demarcation, with a view to separation and extrusion, of those parts which have been so altered that neither their absorption nor their recovery is possible.

More shortly, inflammation, whether aseptic or septic, consists of the series of phenomena necessary for the removal, or for attempting the removal, of effete and irritating matter from a damaged area by the physiological processes of absorption, of extrusion, of demarcation. and of revival, or by one or more of these.

In defining inflammation, the idea that a destructive or an impaired action is a part of this process must be carefully excluded.

Inflammatory fever may be described as a process of general physiological increased activity which accompanies an inflammation, and is reflexly induced by the state of partial devitalisation of tissue in the injured area.

Fever due to, or complicated by, irritants circulating with the blood is excited in exactly the same way by a widespread irritation and partial devitalisation of tissue.

In all circumstances when the damaged tissues are physiologically removed, whether by absorption or by extrusion, or by demarcation, or when they are revived, if no fresh source of irritation arises, the local and general signs of inflammation cease, and healing, if there is a wound which has not already closed, progresses steadily.

If there be a solution of continuity of tissue in association with an injury, the inflammatory changes are those by

which repair also is initiated. The completion of this process may, however, occupy an indefinite time, especially if the mechanical separation of tissues physiologically marked off is difficult.

I would reiterate that I am following the teaching of Lister when I maintain that inflammation is not necessarily an infective process.

I would also add that there is nothing in the views expressed in the foregoing pages that is inconsistent with the fullest appreciation of the enormous importance of bacteriological science. I do think, however, that in pursuit of this science the importance of the natural processes taking place in the living healthy body should not be under-estimated. There seem to be not a few who believe that no local or general reaction ever follows any injury, so long as no micro-organisms are permitted to enter a wound. The idea that the human body resents only the irritation of living organisms seems to me as probable as would be the belief that a foreign navy might bombard the port of London, and that nothing would happen except that the inhabitants would clear away the débris and build up what was knocked down, without excitement here or elsewhere.

"UNE GOUTTE DE LAIT"

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ON the 20th October last there was opened in Paris the First International Congress of the "Gouttes de Lait." Comparatively small in number, its members nevertheless included—in addition to representatives of practically all European nationalities—representatives from Egypt, St Petersburg, and North and South America, who had come especially to Paris to attend the meetings of the Congress. Its duration was but for two days, and was prolonged for other two by visits to institutions of the same suggestive name in Rouen, Havre, and Fécamp. That the actual management of the Congress was a marked success was admitted on all hands; while never was French charm and tact more evident than in the kindly consideration and

sumptuous hospitality which ensured the comfort and pleasure of all visitors.

Many interesting papers were read, and many heated discussions took place, and the different methods of working in the various countries were fully discussed; while the importance and success of the meeting was proved by the unanimous agreement to have a second Congress in the near future.

To many English physicians the words "Goutte de Lait" convey little beyond what their strict interpretation implies, and, unfortunately, in our own country of Scotland the number of "Milk Depôts" is still so small—and, might one add, their value is so little recognised by great numbers of the medical profession—that the value of the work being done abroad, and the importance attaching to it, is but ill realised.

The valuable work of M'Leary at Battersea, and his most instructive book on "Infantile Mortality and Infants' Milk Depôts," has done much to encourage such institutions in this country, and one cannot but hope that as a result of this International Congress a much greater impetus may be given to the realisation of their importance, and the formation of similar institutions throughout the land.

That it should be necessary to provide on a large scale for the artificial rearing of infants is doubtless regrettable, but in the economic and social conditions prevailing in the present day throughout practically all civilised countries, this question undoubtedly is one which has to be faced.

In many maternity institutions—notably that of Professor Budin in Paris—the nourishment and progress of the child are carefully watched and regulated for months, and even years, after the mother leaves hospital. In such cases, naturally, breast feeding is the rule, and of the infants in Professor Budin's clinique, 60 per cent. are brought up wholly on the breast, 34 per cent. on mixed breast and artificial feeding, and only 6 per cent. wholly on artificial feeding.

Such cases, however, form a small minority of the birth-rate in a city, the great majority of women having their accouchement in their own home, and many of them, owing to their multifarious duties, having extremely little time to spare for child-bearing or child-rearing.

For such cases, where breast-feeding, for one reason or another, is entirely out of the question, or where it can only partially be employed, were the "Gouttes de Lait" formed.

Thanks to them, the infant is at least assured of a clean supply of nourishment in reasonable quantities, and, if the instructions handed to each mother are sensibly acted on, the institution also acts as an important educational centre.

In the Hôpital des Enfants at Paris there is a crêche for children under one year of age who are seriously ill. Attached to this there are always several nursing mothers, so that when possible human milk is given to the children, and otherwise they are given sterilised milk. Despite the utmost care and attention, the mortality of this portion of the hospital never sinks beneath the appalling figure of 50 per cent., undoubtedly owing to the massing together of numbers of infants all seriously ill. The results in the various "Gouttes de Lait" throughout the city are very markedly different.

In all these institutions sterilised milk is used, the degree of sterilisation, however, varying, as in some the milk is raised to a temperature of 110° Centigrade, and in others to 102° Centigrade.

Dr Variot at the Belleville Dispensary uses milk which has been sterilised at 110° Centigrade for three-quarters of an hour. Caramelisation occurs at a temperature of 105° Centigrade, and consequently his milk is of a distinctly brownish colour. The milk is sterilised at the dairy and brought daily to the dispensary for distribution; while once a week all infants have to be brought to the dispensary, weighed, and personally examined by the physician. Despite the very high temperature at which the milk is sterilised, Dr Variot states that he has never known of a case of scurvy or rickets caused by it.

He commences with a modified milk of two parts of milk to one part of water, and gradually decreases the amount of water, while his bottles are of various sizes corresponding to the quantities of food suitable for infants of varying ages. With a clientele of some 250 infants the weekly examination is no light task.

At the Havre Institution Dr Caron uses milk sterilised at 102° Centigrade for three-quarters of an hour, and he commences the very youngest babies with pure milk in very small quantities and gradually increases the amount given. Should a very young baby be unable to take this pure milk, the mother is instructed to add a definite quantity of water to each bottle. This latter method is obviously open to severe criticism, owing to the impossibility of ascertaining that the correct quantity of water is used, and also to the probable use of imperfectly sterilised water.

At Rouen, for his "Goutte de Lait," Dr Brunon obtains the milk from a model dairy where the milk is sterilised before being brought into the town. At this dairy extreme care is taken in the cleanliness of the animals, and also in the cleansing of the udders previous to milking; but one was surprised to notice that the same cloth and pail of water were used for

cleansing one cow after another! It also seemed curious to learn that it was considered necessary to keep the cows indoors practically all winter!

Needless to say all the cows had passed the tuberculin test.

Dr Dufour at Fécamp also uses milk sterilised at 102° Centigrade for three-quarters of an hour, and divides his patients into three classes: (1) those who get their milk free; (2) those who pay a very little; (3) those who pay the full price.

This institution, one of the earliest in France, is also one of the most complete.

In several of the country institutions in France the milk is merely pasteurised and not fully sterilised; but in the towns pasteurisation is not found sufficient.

In New York, on the other hand, in the Depôts of Nathan Straus, the milk is pasteurised, being kept at a temperature of 167° Fahrenheit for 20 minutes. Modified milk is used here, and no bottle is sold 24 hours after pasteurisation, while the bottoms of all the bottles are rounded, a device I noticed in none of the French Depôts.

As showing the value of the work of Nathan Straus in New York, I may quote from his paper laid before the Congress. He said: "The constant increase of the scope of my work can be best seen from a consideration of the following figures:—

"In 1893, 34,400 bottles were dispensed. During the present year, 2,668,397 bottles have been dispensed, and 1,016,731 glasses of pasteurised milk drunk on the premises. Its results can be more eloquently told by the statistics of the Health Department than by any words of mine. These statistics show that the death-rate per thousand of children under 5 has gradually decreased from 96.5 per thousand in 1891 to 63.0 per thousand in 1904."

In Belgium, sterilised milk depôts are very numerous, while in many towns in Germany it is essential to have a municipal "Goutte de Lait."

In France these institutions are mainly managed by philanthropic societies, while in England almost all are managed by the municipal authorities, and in our own immediate neighbourhood we are fortunate in having the municipal depôt of Leith.

To anyone seeing anything of the manner of nourishment of young infants of the poorer classes, the value of a clean, well-regulated milk supply cannot but be obvious. That the method of sterilisation and the percentage composition of the various milks distributed by different institutions vary very largely, serves merely to bring into greater prominence the great value of a clean milk, in moderate quantity and at regular

intervals; and to whom should we look if not to the municipal authorities for the providing of this supply? Our water is rigorously tested, and why not our milk, which is surely of equal importance with it?

Undoubtedly it is asking too much to expect the medical officer of health to provide for this certified milk, and at the same time to superintend the management of all babies fed on it. Occupied by other important duties, his time does not permit him to do so, and circumstances do not require it of him. For healthy infants his supply of milk and his supervision are all important, and should be readily obtainable; while for sickly infants requiring more time and attention, the hospital, private, or above all, dispensary doctor is obviously the most suitable guide.

The great difference between the working of the French "Gouttes de Lait" and the British Milk Depôts consists in the degree of medical supervision, and given a satisfactory municipal supply of certified milk, it must of necessity rest with the general body of medical practitioners, and more especially with physicians for children, to control and supervise the distribution of this milk.

Obituary

Dr R. Lucas, Dalkeith

IT is with much regret that we record the death of Dr Robert Lucas, of Dalkeith, on October 27. In him the profession has lost one who worthily upheld its dignity and added to its value as a factor in the world's welfare, both by the integrity of his character and the faithfulness of his life-work. Born at Gorebridge fifty-nine years ago, he was a mere infant when his father, Dr John Lucas—a highly-respected physician of his day—removed to Dalkeith and commenced practice there. From his parents, who had each distinct gifts of intellect and culture, Robert Lucas inherited many of the highly characteristic graces of mind and manner which gave to his personality an abiding interest and charm. After being a pupil at the High School of Dalkeith and at the Edinburgh Academy, to which seminaries he ever afterwards bore a warm attachment, he attended the medical classes in Edinburgh University, and graduated in Medicine in 1867. In his day Brewster was Principal, and such men as Lyon Playfair, Simpson, Christison, and Spence occupied Chairs, and attracted students to their teaching from all parts of

the English-speaking world. These were halcyon days to the young and ardent student, to which he often referred in after times, and when he formed many firm and lasting friendships among his comrades, many of whom still survive to mourn their friend. After a successful University career, he left college at an age when most men now enter it, and became assistant to Dr Wilson, in Gateshead. From that post of wide and varied experience he was called home in 1869 to take up the practice of his father, who had suddenly died at the age of sixty. Thereafter, till his death, he lived and laboured most acceptably in Dalkeith, among his own people, much beloved and deeply trusted. He received his degree of M.D. in 1870, the subject of his thesis being "The Pathology and Treatment of Hæmorrhage." Elected a Member of the Royal College of Physicians, Edinburgh, in 1878, he received its Fellowship in 1892, and took an unfailing interest in the proceedings of the College, to which he was proud to belong. He held appointments under the Factory Acts and in the Post Office, was professionally connected with the Order of Foresters, and was Medical Officer for the parishes of Dalkeith and Newton. His connection with the Militia—a battalion of the Royal Scots stationed at Glencorse—was long and honourable, and added greatly to the breadth and interest of his life. On the parade ground and at the mess table the doctor was one of the best-known and most popular of officers, and he had reached the rank of Surgeon-Lieut.-Colonel when he died. In addition to these appointments he carried on a large family practice, but he always found time—as every medical man finds need—to read widely the literature of the subject, and to keep abreast of the advance in thought and practice. He was no idle praiser of the past, but, with all the eagerness of the true student, heartily welcomed the light of freshly discovered truth. This true

liberalism in thought and action he maintained to the last, and the knowledge of this in their medical adviser deepened the faith and respect with which his patients regarded him.

A many-sided man, it is difficult to say where Dr Lucas was seen at his best. He who could be tender as a woman in sickness and sore troubled by the grief he could not assuage, was yet the life and heart of the society in which he freely moved. His cheery manner, ready wit, overflowing humour, kindly heart, made him a welcome guest in public and private social gatherings. As a Forester and Freemason, on the golf-course, on the bowling-green, and on the curling-rink, his influence on the social life of the community went deep and far, and always for good. But he was far from insensible to graver claims. A lifelong Conservative, he took an active interest in the work and aims of the party, and was a vice-president in the local Unionist Association; he was a member of the School Board of Dalkeith for a long period; was a highly esteemed elder in the West Parish Church for twenty-six years; and passed through the various stages of civic power till he occupied the Provost's Chair for a term of office. His death in the very midst of activity and usefulness fell like a desolating blow on the whole community. Each family felt it had lost a loved and trusted friend. His remains were followed to the grave by such a concourse as had never been seen before in Dalkeith on a similar occasion, and the emotion of those present showed how deeply "this beloved physician" had entered into the affection of those among whom and for whom he had spent his life. He leaves a widow and two sons for whom great sympathy is felt.

James Jamieson, M.D., F.R.C.S., Edinburgh

JAMES JAMIESON, who died in his residence at George Square on 3rd November, was one of the senior medical practitioners in the south side of Edinburgh. Born at Bowden, Roxburghshire, in 1841, he was educated first in his native parish school and afterwards at Galashiels. At the age of fifteen he came to Edinburgh, and was apprenticed to the late Dr Alexander, who had a large middle-class practice. With him he obtained a thorough grasp of the practice of pharmacy and the properties of drugs, on which he afterwards prided himself. He began the study of Medicine about this time and took the Double Qualification in 1864. The following year he went to Chanàral, Chili, where he remained for four years as medical officer to a mining district. After his return he married the daughter of the late John Boyd,

M.D., Slamannan, and settled down to practice in Rankeillor Street. In the midst of hard professional work he constantly strove to better himself professionally, and found time to take the Fellowship of the College of Surgeons in 1880, and the M.D. of St Andrews in 1883. He always enjoyed robust health and hardly had a day's illness until his last attack. It is of melancholy interest that it was on his way to the clinical meeting of the British Medical Association, in February, that he first complained of the sense of oppression which was a premonitory symptom of the attack of angina pectoris which he had a month later. Dr Jamieson took a great interest in the quater-centenary celebration of his college and worked hard to organise that part in which he was specially interested, namely, the service in St Giles. Shortly after these functions ended, a second attack of angina was the commencement of a long and painful illness which culminated in his death at the age of sixty-four. He was a kindly, genial man, whose patients were all firm friends. His professional work was marked by methodical care and he had a great love of order. Although one of the older practitioners, he took the greatest care to keep himself up to date. In that stronghold of chloroform, Edinburgh, he was a pioneer of ether as an anæsthetic in minor surgery, and held that the element of risk did not justify the use of chloroform in small operations. He lived to see ether largely employed in the said stronghold as a general anæsthetic.

He was one of the first in Edinburgh to use diphtheria antitoxin, and after his death there was found, hidden away, a small capsule of Koch's tuberculin with a syringe all ready for use.

Dr Jamieson had the gift, invaluable to a general practitioner, of obtaining the confidence of children, and his bright manner rendered him a favourite with the little ones.

His early death leaves a blank among the older practitioners in the city of Edinburgh.

Dr Jamieson leaves a widow and two sons, one of whom has for some years been associated with him in his practice.

Dr Benny, Denny

BY the death of Dr Michael Benny the Profession in Scotland has lost one of her ablest and most cultured practitioners. He studied at the Universities of Edinburgh and Glasgow when Christison, Syme, Simpson, the two Begbies, Professor George Buchanan, and Sir George Macleod were in the zenith of their fame, so that when he graduated as M.D. in 1861 he carried with him to Denny the impress of great teachers, which had an

abiding influence for the rest of his life. It was not long before Dr Benny acquired a large practice, and the number of accidents he had to attend to in connection with the works made him a warm supporter of the late Mr John Collins, Paper Manufacturer, Denny, in his efforts to erect a Cottage Hospital; and ever since its opening Dr Benny advocated its usefulness, and was mainly instrumental in making it an exceedingly popular institution. It is at present being enlarged, and its work is carried on by his two sons-in-law, Dr Joss and Dr Lumsden, who have been for a number of years happily associated with him in his practice. His paper on "Amputations after Injury in the Country," shows how thoroughly he understood his work and how successfully he carried it out. He was an excellent operator and kept himself informed of all the advances in Medicine and Surgery, and it was impossible to meet him in consultation without feeling that in a great degree he was gifted with a large amount of that medical instinct which is so helpful in dealing with disease. His commanding presence and charm of manner inspired many a sufferer with fresh hope and often did more than drugs to hasten on recovery. Dr Benny was an enthusiastic sportsman and enjoyed nothing better than a day on the moors or at the covert side, and was one of the keenest curlers in the County of Stirling.

Latterly he devoted himself to consulting work and his opinion was greatly valued by all who knew him.

In the midst of his busy life he found time to take an interest in many matters outside his profession.

The appreciation in which he was held was evident on the day of his funeral, which was the largest ever seen in Denny, the whole district turning out to attend it in order to show their respect for his memory.

Much sympathy is felt for his widow and family.

Births and Deaths registered in Eight of the Principal Towns of Scotland during September 1905

DURING the month of September 1905 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth the births of 3685 living children, of whom 1926 were males and 1759 females. These births are equivalent to an annual birth-rate of 25.6 per thousand of the estimated population of these towns, a rate which is 1.9 per thousand less than that for August, and 1.5 less than that for September of last year. In Aberdeen the birth-rate was 28.9 in Greenock, 27.2; in Glasgow, 27.1; in Leith, 24.5; in Dundee 24.3; in Paisley, 24.0; in Edinburgh, 21.9; and in Perth, 21.7.

Of these births 3419 were legitimate, and 266 or 7.2 per cent. were illegitimate. The illegitimate rate was highest in Aberdeen, 9.3, and lowest in Perth, where no illegitimate births were recorded. The rate in Dundee was 9.1; in Paisley, 8.9; in Glasgow, 7.1; in Edinburgh, 6.8; in Greenock, 5.7; and in Leith, 3.7.

The deaths of 1048 males and 1019 females were registered in these towns during the month. The total of 2067 for both sexes is at the annual rate of 14.4 per thousand of the estimated population. The actual number of deaths is 57 fewer than that for August, and 197 fewer than that for September 1904; the death-rate is 0.1 more than the rate for August, but 1.6 less than that for September of last year. The death-rate for the month ranged from 15.8 in Dundee to 11.6 in Aberdeen. In Glasgow it was 15.5; in Greenock, 14.4; in Edinburgh, 13.6; in Perth, 13.2; in Paisley, 12.5; and in Leith, 12.3.

Of the 2067 deaths, 718, or 34.7 per cent., were of children under five years of age, and 475, or 23.0 per cent., were of persons of over sixty. Compared with the numbers for August, deaths of children under five are 65 fewer, and those of persons over sixty are 26 fewer; compared with the numbers for September of last year, deaths under five are 123 fewer, and those over sixty 87 fewer.

Deaths of infants under one year old numbered 479, which is 64 fewer than in August, and 109 fewer than in September 1904. The infantile mortality rate per thousand births was 117, being 12 per thousand less than the rate for August, and 24 per thousand less than that for September of last year. The infantile mortality rate for the month was highest in Dundee, 162, and lowest in Perth, 75. In Edinburgh it was 122; in Glasgow, 115; in Paisley, 114; in Aberdeen and in Greenock, 110; and in Leith, 88.

The principal epidemic diseases caused 210 deaths, and the equivalent annual death-rate was 1.5 per thousand, a rate which is 0.3 less than that for August, and 0.6 less than that for September 1904. This rate was highest in Paisley, 2.3, and lowest in Leith, 0.7. In Glasgow it was 1.7; in Dundee, 1.6; in Greenock, 1.2; in Edinburgh and in Perth, 1.1; and in Aberdeen, 0.9.

No deaths were recorded from small-pox. Measles caused 19 deaths, which is 26 less than in August, but 4 more than in September 1904. Deaths from hooping-cough numbered 38, and were 25 fewer than the number for August, and 36 fewer than that for September of last year. Deaths from diphtheria numbered 26; this is 18 more than in August, and 7 more than in September of last year. Scarlet fever was the cause of 13

deaths, typhus of 4, and enteric fever of 18. From diarrhœa there resulted 92 deaths, being 42 below the number for August, and 49 below that for the previous September.

Influenza caused 7 deaths; puerperal septic infection, 10; malignant disease, 125, of which 66 were ascribed to carcinoma, 11 to sarcoma, and 48 to cancer not otherwise defined. Deaths from diseases of the heart numbered 182; from apoplexy, 116; from premature birth debility, 55; and from alcoholism, 12.

Deaths from pneumonia numbered 139, and constituted 6.7 per cent. of the total deaths; those from bronchitis numbered 103, and constituted 5.0 per cent. of the total. The deaths from pneumonia were 15 more than in August, but 21 fewer than in September of last year; those from bronchitis were 36 more than in August, and 6 more than in September 1904.

Deaths from phthisis amounted to 175, and constituted 8.5 per cent. of the total mortality. These deaths are 17 less than the number for August, and the same as the number for September of last year.

To violent causes 96 deaths were ascribed; of these 6 were suicidal, and all were by hanging.

The deaths were recorded of 1 man and 5 women at ages over 90 years; the oldest was a widow aged 94.

Births and Deaths registered in Eight of the Principal Towns of Scotland during October 1905

DURING the month of October 1905 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4032 living children, of whom 2048 were males and 1984 females. These births are equivalent to a birth-rate of 27.1 per thousand of the estimated population of these towns, a rate which is 1.5 per thousand more than that for September, but 0.6 per thousand less than that for October of last year. In Aberdeen the birth-rate was 31.6; in Leith, 29.8; in Glasgow, 28.1; in Greenock, 27.7; in Dundee, 27.3; in Paisley, 25.7; in Perth, 25.1; and in Edinburgh, 22.3.

Of these births, 3744 were legitimate, and 288, or 7.1 per cent., were illegitimate. The illegitimate rate was highest in Dundee, 9.7, and lowest in Perth, 1.4. In Edinburgh the rate was 8.9; in Aberdeen, 8.7; in Glasgow, 7.1; in Paisley, 3.7; and in Leith and Greenock, 2.4.

The deaths of 2484 persons were recorded in these towns during the month, of whom 1272 were males and 1212 females. These deaths represent an annual rate of 16.7 per thousand of

the estimated population. The number of deaths is 417 more than that for September, and 110 more than that for October 1904; the rate of mortality is 2.3 per thousand above that for September, and 0.5 above that for October of last year. The highest death-rate for the month occurred in Dundee, 18.9, and the lowest in Leith, 13.2. In Glasgow it was 17.5; in Paisley, 16.8; in Greenock, 16.6; in Edinburgh, 16.2; in Perth, 15.8; and in Aberdeen, 14.0.

Of the 2484 deaths, 831, or 33.5 per cent., were of children under five years of age; and 655, or 26.4 per cent., were of persons of over sixty years. The deaths of children under five are 113 more than the number for September, but 82 less than that for October 1904; the deaths of persons of over sixty are 180 more than that for September, and 121 more than that for October of last year.

Of the 2484 deaths registered, 527 were of infants under one year of age, this number being 48 more than that for September, but 70 less than that for the corresponding month of 1904. The infantile mortality-rate per thousand births was 125, which is 8 per thousand more than the rate for September, but 14 per thousand less than that for October 1904. The infantile mortality-rate was highest in Dundee, 133; and lowest in Perth, 43. The rate in Edinburgh and Aberdeen was 130; in Glasgow, 127; in Greenock, 124; in Leith, 109; and in Paisley, 106.

The seven principal epidemic diseases accounted for 208 deaths, which represents an annual death-rate of 1.4 per thousand of the estimated population, this rate being 0.1 per thousand less than that for September, and 0.2 less than that for October of last year. These diseases caused a death-rate in Dundee and in Greenock of 1.8 per thousand; in Glasgow, 1.7; in Leith, 1.3; in Paisley, 1.2; in Perth, 1.0; in Edinburgh, 0.9; and in Aberdeen, 0.8.

Measles caused 63 deaths, which is 44 more than in September, and 38 more than in October 1904; 50 of them occurred in Glasgow and 11 in Dundee. To whooping-cough 35 deaths were assigned; this is 3 below the number for September, and 48 below that for October of last year. Diphtheria was the cause of 28 deaths, which is 2 above the number for the previous month, but the same as that for the corresponding month of last year. Deaths from scarlet fever numbered 10, from typhus fever, 1, and from enteric fever, 17. Diarrhœa caused 54 deaths, which is 38 less than the number for September, and 7 less than that for October 1904.

Influenza caused 14 deaths; puerperal septic infection, 11; diseases of the heart, 260; cerebral hæmorrhage, 131; premature

birth debility, 89; alcoholism, 11; and malignant disease, 134, of which 64 were returned as due to carcinoma, 12 to sarcoma, and 58 to cancer or malignant disease without further specification.

The deaths from pneumonia numbered 248, and constituted 10.0 per cent. of the total mortality; those from bronchitis numbered 175, and constituted 7.0 per cent. of the total. The deaths from pneumonia are 109 more than the number for September, and 3 more than that for October 1904; those from bronchitis are 72 more than the number for September, and 32 more than that for October of last year.

From phthisis there resulted 203 deaths, which is equal to 8.2 per cent. of the total deaths, and is 28 more than the number for September, but is 3 less than that for the corresponding month of last year.

From violent causes there resulted 108 deaths, of which 8 were suicidal. Of these suicidal deaths, 4 were by hanging, 3 by cut-throat, and 1 by precipitation.

The deaths were recorded of 2 men and 8 women aged 90 years and upwards, the oldest of whom was a widow aged 96 years.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

THE first ordinary meeting of the session was held on November 1—the retiring President, Professor Chiene, C.B., in the chair.

Dr J. O. Affleck was elected President for the next two years.

Mr Stiles showed: (1) a patient to illustrate the treatment of general peritonitis by multiple drainage; (2) a patient after operation for aggravated ununited fracture of the femur; eight screws had been inserted, and the patient was as fit for work as ever; (3) a patient after removal of a strangulated intra-abdominal testicle; and (4) a patient showing a marked degree of Volkmann's contracture following fracture of the forearm.

Dr Shennan exhibited preparations showing spirochæte pallida.

Drs A. Bruce, M'Donald, and Pirie showed specimens and photographs of a localised doubling of the spinal cord.

Mr Miles showed prostate glands removed by supra-pubic prostatectomy, a stomach removed for cancer, and a ruptured extra-uterine gestation.

Mr Stiles showed specimens of tuberculous kidney, calculus

pyonephrosis, hydronephrosis with hypertrophy of the opposite kidney, gangrenous gall-bladder with perforation, strangulated intra-abdominal testicle removed by laparotomy, prostate removed by Freyer's method, small intestine resected for fæcal fistula, malignant stricture of œsophagus, carcinoma of ascending colon, a fæcal mass impacted above a malignant stricture of pelvic colon and of carcinoma of the rectum.

Professor Chiene delivered his valedictory address, which will appear in next month's *Journal*.

The new President, Dr Affleck, then took the chair, and after thanking the Society for his election, moved a hearty vote of thanks to Professor Chiene. This was supported by Emeritus Professor Simpson and Dr Clouston.

Drs David Lawson and Ian Struthers Stewart read a paper on the use of the opsonic index of the blood in the diagnosis and treatment of pulmonary tuberculosis. Points in technique, tabulated cases, and temperature charts were shown with the lantern. The authors stated that the opsonic index might be of considerable value as an element in diagnosis, and was of great service as a guide in the therapeutic use of tuberculin. Following the use of tuberculin, there was a negative phase during which the opsonic index fell, and during that period further doses of tuberculin should not be administered. Dr A. Bruce said he had seen improvement follow the use of tuberculin controlled by a study of the opsonic index in cases of lupus. He had found no manifest improvement in cases of advanced phthisis.

Dr Gulland remarked that he had hitherto refrained from the use of the method, as experiments in animals had shown that a rise in the opsonic index was not necessarily accompanied by a corresponding rise in the degree of immunity.

Drs Caverhill, Shennan, Beattie, Mr Stiles, and the President also discussed the paper.

Edinburgh Obstetrical Society

THE first meeting of this society was held on the 8th November. In the unavoidable absence of the President, Dr Brewis, Professor A. R. Simpson occupied the chair. The following gentlemen were elected office-bearers for the ensuing session:—President, Dr J. W. Ballantyne; Vice-Presidents—Senior, Professor Sir Halliday Croom; Junior, Dr Berry Hart; Treasurer, Dr Wm. Craig; Secretaries, Dr Lamond Lackie, Dr Barbour Simpson; Librarian, Dr Haultain; Editor of Transactions, Dr Angus Macdonald; Members of Council, Professor Simpson, Dr W.

Fordyce, Dr Thos. Wood (Leith), Dr Oliphant Nicholson, Dr N. T. Brewis, Dr Munro Kerr, Dr Freeland Barbour, Dr Haig Ferguson.

Dr Freeland Barbour read a note on a case of exomphalos complicating labour which he had seen with Dr Craig of Parkhead. The fœtus had died in utero. The onset of labour was marked by a copious accidental hæmorrhage, for which there was no evident cause. The placenta showed no signs of old hæmorrhages, and the bleeding occurred before the os was dilated; it could not therefore be due to detachment of the placenta by a short cord, but was itself apparently the exciting cause of labour. The fœtus presented by the breach and the presence of the tumour caused two hours' delay in the expulsion of the trunk, which was delivered chiefly by suprapubic pressure. There was no hæmorrhage in the third stage. The fœtus showed anencephaly with spina bifida as well as exomphalos.

Dr B. P. Watson read a communication on "Removal of the Liquor Amnii, a cause of death of the fœtus and changes in the placenta: an experimental investigation on the rabbit," which will appear in next month's Journal.

The reading of the paper was followed by a discussion, which was taken part in by Professor Simpson, Drs Berry Hart, Haultain, Barbour, Fordyce, and the President, Dr Ballantyne.

Royal Medical Society, Edinburgh

THE first ordinary meeting of the above Society was held on Friday, Nov. 10, when Dr J. M. Graham, the Senior President, delivered his presidential address. Taking as his subject "The Advance of Medicine in Japan," Dr Graham first directed attention to the retrograde condition of that science prior to the revolution in 1868. He introduced many interesting illustrations. Thereafter he proceeded to contrast it with the state of medicine in Japan at the present time, and showed how great an interest the State took in the subject. On the motion of Dr Stuart, seconded by Dr Wilkie, a hearty vote of thanks was accorded to Dr Graham for his interesting and able address.

THE second ordinary meeting of the above Society was held on Friday, Nov. 17, when Dr Chambers delivered his presidential address from the chair. He took as his subject the "Royal Medical Society of Edinburgh, 1855-56," and proceeded first to point out how many of the members who took an active part in the proceedings of that year had later become famous in

the different branches of medicine. He next took up the work done by the Society and quoted from some of the more noteworthy discussions, and showed that in many instances the subjects of the dissertations became the life-work of many of the authors. Mr Grahame Brown moved, and Mr J. N. M'Turk seconded, a hearty vote of thanks to Dr Chambers for his very interesting address.

Dr W. M. Hewatson presented a surgical case of streptococcal poisoning resulting from a wound of the thumb, in which Bier's treatment had been applied to the upper arm. A vote of thanks was moved by Mr Drennan and seconded by Mr Marshall.

THE fourth ordinary meeting of the above Society was held on Friday, Nov. 24, when Dr W. A. Neill delivered his presidential address from the chair. He took as his subject "Sydenham, the Father of Modern Medicine," and first gave a brief outline of the more important events of Sydenham's life. Thereafter he proceeded to criticise the man and his work, emphasising those points in which he was in advance of his contemporaries, and comparing him with Harvey, more especially as regards their motives and methods.

Dr L. S. Milne proposed, and Mr T. B. Johnston seconded, a very hearty vote of thanks to Dr Neill for his address.

Dr Rousseau presented a very typical case of pernicious anæmia, and showed some excellent post-mortem specimens and microscopical preparations. A hearty vote of thanks was accorded him, on the motion of Dr Graham, seconded by Dr Chambers.

Glasgow Medico-Chirurgical Society

THE second ordinary meeting took place on October 20—the President, Dr Lindsay Steven, in the chair. There was a good attendance.

(1) Dr G. H. Edington described two cases of hypertrophy of the upper lip, a subject on which surgical literature said little. It had been described on the Continent under the name of "Doppel-lippe" and "levre-double." The first case was a male aged 18 years, who was seen in April of this year. A fold caused by enlarged labial glands projected between the red prolabium and the teeth; it was divided into two by the frænum. The origin was attributed to disorders of the teeth. An elliptical incision was made, the redundant tissue removed, and the enlarged glands cut out. One half was done first, then the

other. The result was rather a short upper lip. The second case was that of a male of 25, seen in September of this year. The double fold was larger on the right than on the left side. It had lasted ten years, and was operated on to give a good cosmetic result. This condition had been described by Boisson as a polyadenoma, and in 1892 Stephen Paget wrote on it in the *Lancet*, drawing attention to the tendency to vertical fissuring, and even ulceration. A good account had been given by Miles, and Sick of Hamburg had also written on it. It was a bilateral affection of the upper lip in males; the prolabium was not affected, and its nature was a hypertrophy of the labial glands. Cause was uncertain, and the treatment was removal.

The cases, which were illustrated by photographs and sections, were discussed by Drs Downie and Arch. Young, and Dr Edington replied.

Dr Edington also showed an automatic wound-retractor, in two forms. The essential part was a U-shaped spring, at the end of whose limbs hooks were attached. In one set the hooks rotated on a horizontal pin, so that the spring could be hinged down and lie out of the way. In the other and larger size the pin was vertical. Remarks on the instruments were made by Drs Pollock and Alfred Young.

2. Dr Kerr Love made a communication on radical mastoid operation, describing five cases and showing two. The essential points in the operation he described as follows:—(1) The mastoid antrum must be opened. (2) The posterior meatal wall must be extensively removed, the facial nerve being guarded. (3) The malleus and incus must be removed. (4) The posterior cartilaginous wall must be split, and the flaps applied to the bony cavity. (5) Lastly, the posterior auricular wound must be stitched, and drainage carried on by the external auditory meatus. Stacke's guide was often used, and the handle had been altered at his suggestion so as to keep the assistant's hand out of the field of operation. Of the five cases brought forward none were acute. All had been cured save the last, which had been done too recently. Two were little girls, one a boy, and two were adults (males). The two who were shown were a man, and a boy who had had chronic mastoid disease with discharge for four years, after scarlet fever. Pus and granulations were found. Both cases gave excellent results. Drs Downie, Barr, Arch. Young, and Lawrie spoke, and Dr Kerr Love replied. Dr Love also showed as a specimen a malleus with a polypus on it, from the ear of a girl.

3. Dr Cuthbert showed, for Dr James H. Nicoll, instruments for making rectangular flaps in osteo-plastic operations on the skull, and demonstrated their application by means of lantern

slides. The instruments were a driving-wheel, cable, and handle for holding trephines; also four saws for cutting through skulls of different thickness. There was also an undercutting chisel for freeing and raising the square of bone after it had been mapped out by the saw.

THE third ordinary meeting of the Society was held on 3rd November—the chair being occupied by the President, Dr Lindsay Steven. There was a very large turnout of members to hear a discussion on the mode of spread of breast cancer, with special reference to treatment, which was opened by Mr Sampson Handley, M.S. (Lond.), F.R.C.S. Mr Handley said that he believed the old view of metastasis and spread of breast cancer by gross particles carried by the blood-stream must be abandoned. His opinion was that spread was by the lymphatics—not a carrying along of particles of the tumour, but a growth of cancer cells along the finer lymphatic channels, a process to which he had given the name "permeation." The spread was therefore centrifugal from the focus. If the tissue were examined the line of spread would not be continuous or traceable from the primary growth, for as extension went on a peri-lymphatic fibrosis occurred, causing the obliteration of certain lymphatics. These points Mr Handley illustrated by lantern slides of many sections. Proceeding, he said that in bone involvement in malignant disease the metastasis was also centrifugal, and one rarely got metastasis beyond the knee or elbow, and in viscera it was not the nearest and most vascular organs, such as the lungs, that were attacked in breast cancer, but those with a communicating lymphatic connection, such as the liver. He considered the epigastric triangle to be a dangerous zone, as by this means infection readily reached the peritoneum. Slides were shown illustrating very early spread of the disease to the anterior sheath of the rectus at the triangle mentioned. In conclusion, the speaker said that of course these investigations affected treatment; he now made a circular incision, about 5 inches in diameter, round the breast, and prolonged a cut upwards to the axilla and one downwards to the epigastric triangle. The deep fascial layer was widely removed.

Sir Hector Cameron said he had listened with great interest to Mr Handley, but could not agree with all his views. His own wide clinical experience had brought before him cases that in their natural history would not fit in with the views just propounded. For example, his experience as regards bone spread was that the order of frequency was as follows:—lumbar vertebræ, dorsal ditto (cervical never), sternum, humerus, forearm. Then he had seen many variations in time of immunity, in site of

metastasis, in alterations in the tumour where not operated on, which he could not reconcile with Mr Handley's views. He believed that certain tissues (soft parts, bones, viscera) showed a selective influence with regard to invasion by cancer, just as they showed towards tubercle or typhoid infection.

Dr Geo. T. Beatson also spoke in the discussion. He said that on many points he agreed with Mr Handley, but he did not think that the latter had made out a case against blood transference. The chief stumbling-block to the acceptance of the permeation theory was the occurrence of isolated and distant metastasis. He believed most metastases occurred in viscera, and mainly in vascular viscera, such as the lungs and liver, which supported spread by blood-stream. At the same time there was no doubt of the occurrence of lymphatic transmission. In cancer of the stomach he had no doubt that the spread to the liver was by the blood-stream.

Mr Hogarth Pringle believed that as far as bone-dissemination went the spread was by the blood. He recollected a case with a small mammary cancer with little axillary involvement, which showed post-mortem only small nodules in the lungs, liver, and kidney, but which showed involvement of practically all the bones—vertebræ, femora, tibiæ, etc. He believed that some tissue-soil was better suited for recurrence or metastasis than others.

Glasgow Obstetrical and Gynæcological Society

THE first meeting of the present session was held on October 25—the President, Dr J. K. Kelly, in the chair. There was a good attendance.

(1) Dr Munro Kerr showed an ovarian tumour removed for twisted pedicle, and a salpingo-ovarian mass which was possibly tubercular; the appendix in this case had nodules on it, and the uterus was bicornuate.

(2) Dr Alex. Miller showed a vesicular mole which he had removed from a young married woman of 20, who was in her first pregnancy. The uterus had very rapidly increased in size.

(3) The President showed what he said was a very rare specimen—an ovarian pregnancy, which would be described at length at a future meeting; also two myomatous uteri removed by the abdomen; and a series of fibromata on the pubic nerve and its branches which had caused great pain.

(4) Dr Nigel Stark read a short paper on a case of prolapse of the uterus in a virgin. He saw the patient last January when she was 18 years of age and had been suffering from the prolapse for two years. She was well-nourished, and menstruated

regularly. She had been an errand-girl, and latterly had worked as a waitress and a laundress; she often carried heavy parcels and stood a great deal on her feet. At first the prolapse was kept up by a pessary, but this failed at last, and when Dr Stark saw her there was marked prolapse of uterus, cervix, and vaginal walls, projecting three inches beyond vulva. Ventro-fixation was done, and a month later anterior and posterior colporraphy.

Dr Stark said some ten cases of congenital prolapse had been recorded, usually associated with spina bifida, and all proving fatal. The question arose as to whether there was not a spinal lesion in these cases in young women leading to paresis of pelvic muscles. There was, of course, here too the carrying of weights, much standing, constipation, and tight-lacing. Diagnosis must be made from cervical hypertrophy. Operative treatment was called for — fixation above and narrowing below.

Drs Kerr, Ritchie, Duff, Russell, Lindsay, and the President spoke on this case, and Dr Stark replied.

(5) Dr Monro Kerr read a paper on a case of extra-uterine gestation going to full time. The patient was a ii-para of 36, admitted to the Maternity Hospital on August 25, 1904. She missed her monthly period in November 1903, passed December too, but in January 1904 had a flow of blood for one day, and the abdomen began to enlarge. Fœtal movements were felt in March, and in June the movements were good. A doctor saw her in August at home, and tried to pass a sound. When examined on August 26, the temperature was 102° F., and the pulse 112. A large bi-lobed tumour was found in the belly, the larger part being to the left and tense, and in it the fœtal head was felt two inches above the brim. The cervix was mesial, os externum patulous, os internum contracted, while there was a false passage in the cervical wall, caused evidently by the sound passed some days previously. During examination, which may, Dr Kerr thinks, have been rather thorough and protracted, the large swelling grew smaller, evidently due to rupture. Laparotomy was done, and fluid blood found in the peritoneum, with a bad smell. The coils of intestine were glued by recent lymph, and flakes were found on the peritoneum. The large burst sac lay in the left broad ligament, and contained a large macerated fœtus. The abdomen was thoroughly flushed out and drained behind, but the patient gradually sank and died next day, the fatal issue being due apparently to septic peritonitis arising before admission to hospital.

Drs Jardine, Douglas, and the President spoke on this case, and Dr Kerr replied.

(6) Dr Balfour Marshall reported a case of ruptured tubo-

peritoneal pregnancy which continued to develop after the primary rupture. The patient was a ii-para of 25, who had had a child five years previously; since then menstruation was regular, the last being June 1905. At end of July, being apparently about six weeks pregnant, severe pain occurred in the right iliac region. From this she rallied, and a good-sized tender swelling, evidently a hæmatocele, formed in the region of the right tube. The abdomen was opened in middle of August, and the ruptured sac found in a mass of blood with a perfect three months' fœtus. The placenta was attached to the tube and posterior layer of the broad ligament. For nearly three weeks of convalescence there was a high temperature (102°-105°), which was due, Dr Marshall thought, to absorption of septic matter from a bedsore.

Glasgow Pathological and Clinical Society

THE second ordinary meeting was held on 13th November—the President, Professor Muir, in the chair. There was a good attendance.

1. Dr Crawford Renton showed a large fibroma of the ovary, recently removed; the condition was rare, and he had only had four cases. He also showed a mulberry calculus from the bladder with peculiar lateral flattening.

2. Dr John Anderson showed (for Dr Hamilton) a sacculated aneurism of the thoracic aorta which had caused great dyspnœa during life.

3. Dr Jas. H. Nicoll gave the following contribution:—

(*a*) He showed a series of 7 infant girls operated on for hernia of the ovary. He had had 10 such cases this year alone (confirmed in 9 by operation), and in all had dealt with 35 cases. An inguinal hernia in a girl under one year generally contained an ovary. It descended into the patent canal of Nuck and the sac contents were ovary, tube, and occasionally omentum or intestine. It was rarely bilateral (2 in 35 cases). Encysted hydrocele of the canal was not common, and he had only seen 4 cases at the Sick Children's Hospital. There was a tendency to natural cure in herniated ovary, but as the child often continued fretful and ill-nourished, it was best to operate and replace the gland. The infant's nutrition then usually greatly improved. In the last 7 cases he had removed the ovary once, as it was inflamed and adherent.

(*b*) Dr Nicoll then read short notes on Cystoscopy, and showed some modern forms of the instrument. One of the great values of it was that it enabled one to fix the precise source of pus or blood. Good results could only be achieved by

having a reliable instrument, much experience, and a great reserve of patience both on the part of doctor and subject. In going to a case in the country, one should always take several lamps, two instruments, and a spare battery. A description was then given of some of the recent forms of instruments, and these were exhibited. Dr Renton, speaking on the subject, said he had had excellent results from the short-beaked cold cystoscope, and that he had found Harris's segregator of much value.

(*c*) The last part of Dr Nicoll's paper was a demonstration by lantern slides of a method he had found very useful in operating upon penile cancer. The growth was usually a superficial epithelioma of corona or prepuce, and extension was along the dorsum of the organ to the superficial inguinal glands, or deeper to the glands lying near the external iliac vessels. In operating he made a Y-shaped incision, the stem of the Y being on the dorsum of the penis (into which a catheter had first been passed), while the arms ran up into the inguinal folds. At the lower end, the stem of the figure ended in a loop-shaped incision encircling the organ. The inguinal and deep glands were easily cleared out, and the penis amputated at the circular cut. After operation, the skin of the groin required to be well pressed down on the fascia below by a firm dressing, else sloughing might follow. He had had 10 cases, with no operation deaths; one case was alive after eight years.

4. Dr Freeland Fergus read a short note on a case of tuberculosis of the conjunctiva, a rare condition. The patient was a boy with an ulcer 4 mm. long on the conjunctiva of the upper lid. There was a superficial erosion and surrounding granulations. A significant feature was enlargement of the pre-auricular and other glands on that side. In scrapings from the ulcer, Dr Inglis Pollock found caseous masses and tubercle bacilli. No other tubercular focus was found. The lid was thoroughly everted and the whole ulcer cleared off and the glands removed. No recurrence has been noted. Dr Fergus referred to the clinical description of this uncommon affection given by Swanzy, and by Haab of Zurich, and to the contributions to its pathology from the pens of Herbert Parsons, Orth, and Gray. Dr Pollock briefly described the ulcer which had a dense-celled floor; no giant-cells were found, but tubercle bacilli were present. Sections were shown.

5. Dr Jas. Hamilton read notes of a case of cerebro-spinal meningitis, and Dr Anderson showed sections and films of the meningococcus. The patient was a labourer aged 24 years, admitted to the Victoria Infirmary on 1st August last. Illness began eight days previously with rigor and severe headache and vomiting. There was pain and rigidity in the neck muscles.

On admission he had a temperature of 101° F. and pulse of 76. Tongue was furred and bowels constipated. No squint, no leucocytosis, and no herpes. Kernig's sign was well marked and a slight purpuric rash appeared on one day. The Widal test was negative. Lumbar puncture on the fifth day yielded a turbid fluid in which diplococci were found. The patient grew more comatose and death occurred on the twelfth day after admission, or the twentieth of the illness. Dr Anderson described the post-mortem appearances (cerebro-spinal exudate), and said he inclined to the view that it was a pneumococcal infection.

Glasgow Southern Medical Society

THE fourth ordinary meeting was held on November 16—the President, Professor Stockman, in the chair. There was a large turn-out to hear Captain Greig, I.M.S., give an account of the investigations into sleeping sickness in Uganda, in which he had taken a part. The mortality was very great, about 1000 a month, and the serious state of matters led the Foreign Office to ask the aid of the Royal Society, who sent out a Commission, to which the speaker was attached, from the Indian Government. A short account of the geographical conditions was first given. Uganda occupies chiefly a crescent of land lying along the north shore of the Victoria Nyanza, a lake as large as Scotland. To the west lie the chain of lakes—Albert, Albert Edward, and Tanganika; to the east, the Rudolph. The lake stands at an altitude of 4000 feet, and is on the Equator. Sleeping sickness, said Captain Greig, was unknown six years ago, and there is little doubt it was carried in by slave-caravans under Emin Pasha.

Clinically, three stages can be recognised:—(1) The early, with but slight fever, or even a normal temperature, and showing no symptoms. An important sign, however, is the existence of enlarged glands, especially in the posterior cervical region. Gradually all the superficial glands enlarge. (2) A stage with marked fever, considerable elevations and depressions, general glandular enlargement, increasing loss of strength, and sometimes mental symptoms (mania or melancholia). (3) The terminal stage, or real stage of sleeping, where the patient lies torpid and soporific, with increasing emaciation and a gradually dropping temperature, till the latter may not exceed that of the air. This stage lasts some ten days. Practically, the disease is always fatal. In the early stage the trypanosoma (Trypanosoma gambiense, Dutton) is found in the blood. The parasite is a flagellate organism, with a large and small nucleus, granules

that take up the chromatin stain, and a fin-like expansion on the back terminating in a free flagellum—the anterior end of the body. It was often difficult to find in the blood. Ten c.cm. were taken from a vein, citrate of potash added to prevent clotting, and the fluid centrifugalised. The supernatant fluid was poured off again, put in the centrifuge, and in it the parasite was got. In later stages it was got from the cerebro-spinal fluid, and always readily from the enlarged glands. Post-mortem, the chief features were increase of cerebral fluid, giving the pia arachnoid a ground-glass appearance and flattening the convolutions, and the occurrence of multiple ulcers in the stomach. These were due to small sub-mucous petechiæ attacked by gastric juice.

Lastly, Dr Greig explained the lines on which the exact etiology and mode of spread of the disease were based:—

(1) It was found that all cases of sleeping sickness showed trypanosomes. (2) That in other native diseases, as well as in healthy natives, the parasite was absent. (3) That wherever sleeping sickness prevailed, the variety of Tsetse fly, Glossina palpalis, was found, a member of the family to which the G. morsitans, or cause of cattle disease ('Ngana) belongs. (4) That even where sporadic cases occurred, the fly could always be found, and that without it there was no such disease. (5) That the parasite could breed and very rapidly increase in the body of the fly. (6) That such flies fed on sleeping sickness cases experimentally could give the disease to monkeys by biting them. (7) And lastly, that flies from infected areas could do the same.

The paper was illustrated by numerous excellent lantern slides, and, on the motion of Professor Stockman, a very cordial vote of thanks was accorded to Captain Greig.

Forfarshire Medical Association

AN ordinary meeting of this Society was held in Dundee on Thursday evening, November 2nd—Dr D. Lennox, Vice-President, in the chair.

Dr J. S. Y. Rogers showed a case of Raynaud's disease in a man 37 years of age. He had been seven years in India, and returned to this country in 1903. In 1898 he suffered from ague, and in 1900 he had syphilis. During April 1903 he was ill with bronchiectasis, and in the winter of 1904 he was attacked with Raynaud's disease. His ears became cold and benumbed, then bluish-red in colour, then a portion of the helix of both ears sloughed, the left more than the right. He had no trouble with his hands or feet till three weeks after. His present

condition was as follows: there was a considerable portion of the left helix eaten away, but only a very small part of the right one; the fingers, instead of being tapering and parchment-like, are thickened and clubbed (almost a condition of osteo-arthropathy), this probably being due to his pulmonary trouble.

In the remarks which followed the predisposing causes such as ague, syphilis, etc., were discussed by various members present.

Dr G. Pirie showed two patients who had been treated with X-Rays. The first was lupus of the ala of nose, spreading to the cheek and lip, of a few weeks' duration. The second was lupus of the cheek of four years' duration. Each had twenty exposures during a period of six weeks, and both developed an acute dermatitis. When this had subsided the lupus was gone in the first case, and there was a great improvement in the second case. A few more exposures would be required to complete the cure.

Several ordinary photographs of these cases at various stages of treatment were also shown.

Dr Pirie then exhibited a series of X-Ray photographs, which included a myosteoma of the upper arm due to an injury two years ago.

Dislocation and fracture of epiphysis of os calcis in a boy, caused by a blow from a stone. Acute and chronic rheumatoid arthritis of elbow, knee, and hands. Fractures of metacarpal bone, and of phalanx of toe and finger. Overgrowth of ulna after injury to wrist, and several other abnormal conditions of bones.

A general discussion followed upon the value of X-Ray photographs in diagnosis, prognosis, and treatment.

Dr R. C. Buist read a few notes on the treatment of asphyxia neonatorum, in which he stated that the recovery of two cases of asphyxia during the past summer had impressed him with the fact that the prognosis was now better with present management than formerly. He recommended the following procedure. After clearing the mouth, and making sure that no obstruction existed to respiration:—

1. Compress the chest manually so as to force the blood to the heart, and thus stimulate direct contraction of that organ.
2. Rhythmic traction on the tongue with forceps.
3. Inflation of lungs with catheter.
4. Artificial respiration by his method, *e.g.* the child is flexed and placed face down on the palm of the right hand, with its head away from the performer, with head and limbs hanging down. It is then quickly rolled over and thrown on to the left

hand, then returned to right hand, and so on, pressure of the fingers aiding expiration, this being a more elegant method than Schultze's.

Editorial Notes and News

University Court Elections.

THE contested elections in Edinburgh and Aberdeen are over. In Aberdeen the result is that Dr Westland joins Dr Angus Fraser on the Court, and thus medicine acquires a second representative. We confess we fail to apprehend the position taken up by some distinguished graduates of the University in the south that they required a representative to look after their interests. For good or ill the fact remains that the Court is primarily concerned with the present students, and surely those on the spot are best qualified to deal with their affairs. So little control have the Scottish Universities over their graduates that even when the General Medical Council removes the name of one of them from the Medical Register, the Universities have no power to take away their degree. The four assessors in Aberdeen University have for many years by agreement represented the four interests of Divinity, Medicine, Law, and Education, and we understand it was the failure of one of these interests to agree on a candidate which led to the contest which has ended in doubling the representation of medicine.

In Edinburgh the election resulted in the return of the two sitting members, and as they are both understood to be in sympathy with the views held by those actively interested in the improvement of medical education, we cannot profess to be anything but satisfied with the result.

The Gynæcological Lectureship.

THERE are of course difficulties in the teaching of Gynæcology which do not occur in connection with the other special subjects, but others less obvious are common to all, and when the authorities are laying down the regulations for the latest Lectureships they may profitably learn from the experience of the earlier courses. The subject is, of course, much discussed, and views are many and discrepant. We do not profess to have solved the difficulties, but we submit the details of a scheme which we believe would work and commend it to the consideration of the Court.

1. Gynæcology should no longer form a part of the Clinical Medicine Course. This will, we fancy, be generally admitted. While it undoubtedly touches medicine—indeed every depart-

ment of medicine touches every other one—it is much more closely associated with surgery, and since the method of teaching clinical surgery fortunately does not permit of it being tacked on to that course, it must be an independent one.

2. The question next arises, What should be the scope of the course? In our opinion it should be purely clinical. As so many teachers have pointed out, Obstetrics and Gynæcology are so closely related that it is impossible for the one to be taught without reference to the other. We would therefore leave the teaching of systematic Gynæcology in the hands of the Professor of Midwifery, who, we surmise, will be hard put to it to fill up his hundred hours with Obstetrics alone.

3. The special class of Gynæcology should be one of Practical or Clinical Gynæcology, and should consist of demonstrations, operations, and cliniques, with as little of the lecture about them as possible. There should be a succession of short courses, and we believe the student would get more benefit from them if they were spread over less time—*i.e.*, if three were given instead of two lectures a week, or alternatively if the class lasted for two hours. It is, we believe, unfortunate that the special classes are nearly all limited to two days, and that students lose valuable opportunities of acquiring information on the other days.

4. Then comes the important question of who is to be the lecturer. We understand that some advocate the appointment by the University of one who shall be in fact if not in name a professor, and that he will be used as a professorial argument in applying to the Managers for a ward. We realise that there is much to be said for the proposal: it is a step towards the recognition of the extra-ordinary professor which we have so long advocated; it would make an opening for the importation of a distinguished stranger in the unlikely event of Edinburgh Gynæcology degenerating; we admit everything that can be said for it, but we are convinced that it would not be in the true interests of the school. These require that the University should widen and not narrow its influence. Opinion is, we think, gradually coming round to the view that the University would be strengthened if all the physicians and surgeons were University clinical lecturers, and where necessary examiners, and here there is to hand an opportunity of experimenting in this direction. We know that the suggestion is not unanimously approved, but we believe the proper solution is to appoint as clinical lecturers on Gynæcology the two senior members of the Gynæcological staff *during their tenure of office.* This would involve no shutting out of non-University students: in

granting their sanction to the arrangements in connection with the Lectureships on Laryngology and Dermatology the Managers stipulated that the courses were to be open to all holding hospital tickets, and the same conditions would apply to these new lectureships.

We have heard it argued that a decision of some sort must be arrived at at once, for the uncertainty is worse than even a bad scheme. We hope, however, that the Court will not hurry its decision, and we would rather muddle along even for a session than see introduced an undigested scheme, too much tinctured with the personal factor, which would be an obstacle to the smooth working of the three-term scheme which we hope soon to see introduced.

Teaching and Examination.

SOME time ago Principal Mackay shocked some of the older members of the General Medical Council by suggesting that certain subjects might be taught without being followed by an examination. We do not know how this would work in connection with the earlier subjects in the curriculum, but experience in Edinburgh shows that it is not merely fear of examination which induces students to take out classes. Much is due to the improvement in the student of to-day, who certainly works harder than his predecessors, and is a remarkably good judge of the uses of classes. Of recent years there have been added to the medical curriculum a whole series of subjects in none of which is there any direct examination—Ophthalmology, Insanity, Fevers, Diseases of Children, of the Ear and Throat, and Skin. The University requires certificates from some of these classes, while others are alternative. Yet they are all well attended; the student recognises that they will be useful in his after career, and without the stimulus of an examination he studies them. We believe that if Gynæcology were placed in the alternative category there need be no fear of the good student neglecting its study, and the bad one learns nothing anyway.

The Social Aspects of Tuberculosis.

AT the recent International Congress on Tuberculosis in Paris, the work was divided among several sections, of which some dealt with Medical and Scientific matters, while one was set apart for the consideration of the important social and hygienic questions presented by Tuberculosis in general, and by Phthisis in particular. Naturally the social value of the Sanatorium received a great deal of attention, and a writer in

La Semaine Médicale—Dr Cheinisse, of Paris, who contributes a long report and review of the proceedings—concludes that on the whole the contributions to the discussion of this subject indicate that the views now generally held are much less sanguine than those put forward at the Berlin Congress in 1899. Less has been expected from Sanatorium treatment in France than in Germany, but we are told that some French physicians were so carried away by what they heard at Berlin, that they have been glorifying the Sanatorium as the only means of at the same time healing the sick and protecting the well, and one even attributed to the Sanatorium the power of saving for France 30,000 lives per annum, and of prolonging the lives of 35,000 more.

At the present Congress such optimistic views found no place. Dr Courtois-Suffit and Dr Charles Laubry, both of Paris, in the course of an elaborate paper, maintained that, however good the results of Sanatorium treatment might be in the case of the rich, equally good results could not be expected in the case of the poor, who in most cases were soon compelled to return to the conditions in which they first contracted the disease. At best the Sanatoriums only prolonged life a little. If the money they cost was simply handed over to the patients so that they might go and live in the country and secure competent medical advice, the result would probably be as good. Nor can the therapeutic ineffectiveness of the Sanatorium be compensated by its prophylactic value. In constructing Sanatoria, society must think only of the humanitarian benefit, without expecting to draw any reward from its generosity. In the struggle against tuberculosis, the first and fundamental step to be taken was to abolish starvation wages. Then sanitation must sweep away narrow streets and overcrowded, unwholesome houses. Last, and least important, the Sanatorium may find a place as part of a vast system of dealing with tubercular disease.

Dr Lophus Bang, chief physician of the Silkeborg Sanatorium in Denmark, agreed that Sanatoriums were not alone sufficient to fight tuberculosis. He challenged the trustworthiness of the German statistics, according to which there were in Germany 71 per cent. of economic cures, though admittedly only 31 per cent. held good after five years. But how many of these 31 per cent. were passive cases which would have recovered spontaneously, even without the aid of Sanatorium treatment. Sanatoriums, nevertheless, had a useful part to play, along with other agencies, and amongst these should be convalescent establishments, where the patients should be made to work, their labour being carefully regulated, as had been done for

the last two years in the Sanatorium of Silkeborg during the last few months of the patient's stay.

In a third report presented to the Congress by M. Beco of Brussels, the fact was recognised that the Sanatorium was not the pivot upon which the struggle with tubercle turned, but as an educational agent the rôle of the Sanatorium was important. But for combating the disease the principal and most fertile means would remain *the better housing of the poor.*

Anti-tuberculous dispensaries received a fair share of attention in the discussion, and there seemed to be pretty general agreement that those which merely gave medical advice and medicine were of very little use from the social point of view. On the other hand, those which did more were apt to be very costly, as in the case of Dr Calmette's dispensary at Lille, which assisted 100 families per annum, but at a cost of £2880. Some speakers, however, were able to cite good work done by dispensaries at a much lower cost. Perhaps the most interesting account of such work was given by Dr Kayserling, general secretary of the Poor Relief Organisation in Berlin. He said that a service organised by the Central German Committee had to see that the rules were carried out in the individual homes. Nine sisters had been appointed in Berlin whose sole mission it was to attend to tuberculous patients. They paid frequent visits, gave food when necessary, and to prevent others sleeping with patients had given 186 beds. Where there was overcrowding they paid the increase of rent necessary to secure one more room, which generally meant from 8s. to 10s. a month. In the course of last year, 227 cases were selected from those being attended and sent to an air-cure station. Of the children, 214 were sent to Sanatoriums, and 500 were sent to the country for six or eight weeks after they left the Sanatoriums. All the work that was done would be impossible were it not for the law of compulsory insurance. In Germany all had a right to relief; it was no favour and no humiliation.

Further information on the German system was contributed by Privy Councillor Bielefeldt, who considers that of all the factors in the fight against tuberculosis, the compulsory insurance amongst the working classes holds the first place. From 1897 to 1904, the insurance societies had sent for treatment to special establishments or to sea-side resorts an aggregate of 101,806 tuberculous patients during 7,687,803 days, at a total cost of over 35 million marks. The results had been very satisfactory. Of patients treated from 1897 to 1900, about 31 per cent. were still capable of working after five years without having required aid for invalidity. The tuberculous

death-rate in German towns of more than 100,000 inhabitants in 1886 was 37.36 per 10,000, while in 1902 it was only 22 per 10,000.

There has been much recent discussion as to the adaptability of German methods of poor and sick relief to conditions prevailing in this country. Both French and English speakers at the Congress, while admitting the thoroughness of German methods, saw difficulties in the way of adopting them in their respective countries, and an English speaker said it was worth consideration whether it might not be worth the while of the Friendly Societies, simply from the financial point of view, to provide treatment for their phthisical patients.

We should like to have referred to a striking report by Dr Romme of Paris on the economic conditions governing the social etiology of tuberculosis, in which he referred to the part played by long hours and unhealthy conditions of work in factories and in the home, by the sweating system, by the employment of women in mills and factories, by overcrowding, and other conditions, but we cannot do more than mention it.

The chief impression one gets from a perusal of the discussions to which we have referred is that in the struggle against tuberculosis, our best hope lies in improved sanitation, both in the household and the workshop, and in efficient public health administration.

Infant Milk Depôts.

DR DINGWALL FORDYCE'S article will be read with interest by all, for every medical man is interested more or less in the feeding of children.

In all branches of Medicine, and not least in Pædiatrics, is it true that "prevention is better than cure."

To attain our promised three score years and ten, and not only so, but to endure that allotted span of life in comparatively fair health, with a moderate degree of comfort and enjoyment, and with the ability to play a man's part in the work of the world, it is essential that for our foundation-stone we should have laid for us a healthy infancy and childhood.

During the period of "muling and puking in the nurse's arms," vastly important and moreover rapid changes take place in the bodily development, and the potential value of the succeeding six ages is largely determined by the success or the supervision of the initiatory stage.

While in this introductory stage the organism is being trained to encounter and resist those ills to which, in the shape of numberless forms of bacteria, flesh is heir, and by gradually

adapting itself to the conditions of human environment, becomes in time more and more capable of doing so successfully.

Guarded merely by the slenderest layer of endothelium—the approach to which is constantly open for the inception of food supplies, while the defensive properties of the line of supply are for long but inadequately developed—the intestinal tract is obviously one of the weakest, if not the weakest, point in the defensive armour of the young. Under normal conditions disaster is avoided by the postponement of the introduction of dangerous elements until such time as the defensive preparations are more thoroughly perfected. But in very many cases maternal nursing for any satisfactory length of time is out of the question, and the duty obviously devolves upon the medical man to provide a safe and satisfactory substitute for breast milk.

The satisfaction of this demand has for long engrossed the attention of pædiatric physicians, with the result that infant feeding, placed upon a scientific basis, has come to occupy—theoretically at least—a very much higher plane in the sphere of preventive medicine. True, in different countries, very different formulæ, procedures, and methods have been adopted as being those found most suitable, but here we must assuredly bear in mind that the varying effects of climate, environment, and the hereditary influences of the customary dietary of the country all have important bearings on the question.

Practically, the subject is fraught with considerable complexity, involving, as it does, not only the attention of the medical man, but also of the political economist, the public health authorities, and the humanitarian. That the distribution of milk under medical supervision is a step in the right direction cannot be gainsaid—that there are many difficulties to surmount is obvious, but that these may be speedily overcome must be the earnest wish of all.

Royal College of Physicians of Edinburgh

A QUARTERLY MEETING of the Royal College of Physicians of Edinburgh was held on Tuesday, November 7, 1905—Dr Playfair, President, in the chair.

The following members were admitted by ballot to the Fellowship of the College:—George Freeland Barbour Simpson; Charles Mowbray Pearson; and Edwin Matthew.

On a ballot the following candidates were admitted to the Membership of the College after examination:—Henry Grab-

ham Lys, Bournemouth; Charles Mackie Begg, Edinburgh; and John Herbert Yearsley, Edinburgh.

The Registrar reported that since the last quarterly meeting forty-nine persons had obtained the licence of the College by examination.

The Hill Pattison Struthers Bursary in Anatomy and Physiology, which is in the gift of the College, was awarded after examination to Mr Andrew Johnstone Brown.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Faculty of Physicians and Surgeons of Glasgow.

THE Quarterly Examinations of the above Board, held in Edinburgh, were concluded on 2nd inst., with the following results:—

First Examination, Four Years' Course.—Mr Aiknath Visajee Bam, Hyderabad, passed the Examination.

First Examination, Five Years' Course.—Of thirty candidates entered, the following eleven passed the examination:—Cornelius O'Herlihy, Berrings; Khorshed Sorabji Kanga, Bombay; Vincent Michael Walsh, Co. Cork; Daniel Hickey, Midleton; Thomas Brownlie McKendrick, Wishaw; Edward Spence, Roxburgh; Augustus Yourdain Kelsey, Mauritius; Harold Hope Scott, Co. Down; Angus Cameron Livingston, Glasgow; Bertram Flack, Burnley; and Robert Massie, Edinburgh; and three passed in Physics, two in Biology, and two in Chemistry.

Second Examination, Four Years' Course.—Of five candidates entered, the following two passed the examination:—John Stanislaus Bruggman, Melbourne; and Daniel Joseph O'Connell, Co. Cork.

Second Examination, Five Years' Course.—Of forty candidates entered, the following nineteen passed the examination:—Edward Roland Porter, Belfast; Thomas Bertram Eames, Stoneclough; Sydney Sharples, Preston; Alexander M'Murray, Belfast; James William Muir Hunter, Nottingham; John Alfred Steele Phillips, Bengal (with distinction); Anna Sarah Lindsay, Ireland; Jane Hall Filshill, Scotland; Thirukamu Sundara Reddy, Cuddalore; Vinayak Shantaram Sanzgiri, Bombay; Charles Liston Stewart, Calcutta; Richard Baring Davidson, Congleton (with distinction); Byramjee Shavakshah Tarapurvalla, Bombay; Alexander O'Flaherty, Ireland; Frank Humphrey Kiddle, India; James Reid, Belfast; Francis

Wardlaw Milne, Helensburgh; David Williamson Anderson, South Queensferry; and Peter Stewart, Uphall; and four passed in Physiology.

Third Examination, Five Years' Course. — Of twenty-one candidates entered, the following thirteen passed the examination:—Ernest Fielden Nivin, Canada; Gertrude Ellen Austin, London; Dennis Cregan M'Cabe-Dallas, London; Oliver David Gunasekara, Ceylon; Alexander Paul Dias, Bombay; Leo Murphy, Co. Cork; Frederick Barnes Elwood, Belfast; John Smith Peebles, Scotland; John William Rajaturai Rockwood, Ceylon; James Ferguson, Irvine; Thomas Campbell Dykes, Dumfries; Edward Arthur Smith, Great Grimsby; and Ratilal Rangildas Bakshi, Jamnagar; and two passed in Materia Medica.

Final Examination.—Of seventy-eight candidates entered, the following thirty-two passed the examination and were admitted L.R.C.P.E., L.R.C.S.E., and L.F.P. & S.G.:—William Graham Scott, Huddersfield; Charles Augustus Eamnson Ring, Kent; James Alexander Mathers, Dundee; Rosa Collier, Glamorganshire; Frederick Francis Middleweek, London; Emile Horace George Duncan, Richmond; Robert Percy Hosford, Enniskeane; James Murphy, Midleton; Richard Geoffrey Shaw Simpson, Monkwearmouth; Harold Salter Gettings, Lutterworth; Sigmund Wertheim, Kirtorf; William Robert Addison Coates, York; John Dixon, Shipley; Hamish Heney M'Intosh, Ontario: Valentine Macdonald, Victoria; Norman Skinner Simpson, Madras; Evan Lawrence Raffel, Colombo; John Coffey, Melbourne; George Duncan Morrison Beaton, Stornoway; Edward Ernest Albert Murphy, Co. Cork; Michael Philip Desmond, Co. Cork; John Kerr Bell, Co. Antrim; Ernest Patrick Titterton, Staffordshire; Narayan Kashinath Desai, Bombay; George Lees Baker, Hastings; John Edwin Bromley, Canada; Raghunath Ramchandra Chaubal, Bombay; Thomas Edward Flitcroft, Lancashire; Thomas Francis Murphy, Co. Cork; Kozhikot Vittil Govinda Menon, Madras; Edward Peter Joseph Dawes, Longton; and John Dawson, Queenstown; and eight passed in Medicine and Therapeutics, two in Surgery and Surgical Anatomy, twelve in Midwifery, and thirteen in Medical Jurisprudence.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

By DAVID LAWSON, M.A., M.D., F.R.S.E.,
Senior Physician at the Sanatorium, Banchory

[1]SERUM THERAPEUTIC TREATMENT OF TUBERCULOSIS

WHILST the numerous so-called accidents which occurred in connection with the early administration of the original Tuberculin introduced by Koch in 1890 served to bring it into disrepute, and to a great extent to retard its general adoption by the profession, it was to another factor that its ultimate complete abandonment as a therapeutic agent in the fight against Tuberculosis was due. This is to be found in what has since come to be referred to briefly as the "London report"—a statement containing opinions based upon the observed behaviour of six test cases placed under its action. In[2] this report, signed by Dr C. Theodore Williams and John Tatham, the result of a long and careful trial of the remedy in cases of Pulmonary Tuberculosis under the care of eight physicians at Brompton Hospital were summarised and published in the year 1891. The report contained amongst others the following statements :—

(*a*) In many cases Tuberculin injections are followed by distinct extension of the disease, as evidenced by the physical signs.

(*b*) The reactions due to Tuberculin are exhausting to the patient and cause loss of weight and strength.

(*c*) The treatment is specially contra-indicated in cases of Pulmonary Tuberculosis accompanied by pyrexia, as likely to convert intermittent into continuous pyrexia.

(*d*) The Tuberculin did not favourably influence the course of the disease in the majority of cases: in some the effects were detrimental; and even in the stationary and improved cases it was difficult to describe any distinct improvement to the injections which might not have been equally attained under the treatment ordinarily employed in the Hospital.

The members of the profession know now what they did not know then, namely, that the cases which the selectors chose, having in their wisdom altogether disregarded the limitations laid down by Koch, were practically all cases of advanced or

[1] A more accurate title would be "*Inoculation* Treatment," as the field covered deals with treatment by inoculation of substances other than sera.

[2] "Diseases of the Lung," by Fowler and Godlees, p. 397.

virulent disease with pronounced pyrexia and marked constitutional symptoms. Indeed they were clinically exactly those types of cases which subsequent experience has abundantly proved to be altogether unsuited for Tuberculin treatment. Still they did not know that then ; and the effect of the report was to lead them to consign to the limbo of disuse, that remedy which but shortly before had been received with acclamation by the whole civilised world as the long-looked-for panacea for every form of Tuberculosis, and to put back for many years to come its adoption as an effective method of treatment in this country.

But the snake was not killed : it was merely scotched. The blow which the inoculation method of treating Tuberculosis received at that time, although severe, was not a fatal one. As will be presently shown, there are not wanting signs even now that that day is not far distant when the basis of treatment not only of Tuberculosis, but of all bacterial invasions, will no longer consist of drugs, but it will consist in the inoculation of the patient with media which in the irony of things will be provided by the organisms themselves. When Behring first announced the discovery of his remedy for Diphtheria, the announcement succeeded in arousing little more than a passing languid interest among us. As years went on, however, and reports began to accumulate from different quarters of the globe where clinicians had been quietly testing its value, and the brilliance of the discovery came to be recognised, there arose in the minds of many vague questionings as to the wisdom of their action in having so quickly discarded the remedy provided in Tuberculin.

The announcement made about this time (1897) by Koch [1] of the discovery of three new Tuberculins, and the reiteration of his belief that he still regarded Tuberculin inoculations as the best remedy against Tuberculosis, served still further to awaken interest in the subject. Since that time there have been silent, patient workers in the field, investigating the problem ; some searching for new remedies, others testing at the bedside those which already lay to their hand. The results of these labours have been coming to light from time to time, so that now there is available a mass of data sufficient to enable us to arrive at an opinion as to how far we ought to include in our method of treating Tuberculosis that of inoculating with specific media.

It may not be inappropriate in a review such as this to recall the fact that, broadly speaking, the toxins of Tuberculosis used for inoculative purposes may be divided into two classes.

[1] *Deut. med. Woch.*, April 1, 1897.

In the first place there are the toxins which are formed outside of the bodies of bacilli—whether secreted by them or how otherwise formed need not now concern us. These have been called the *extra-cellular* toxins, and are well illustrated in Koch's original Tuberculin which he gave us in 1890. In the second place there are toxins which are formed within and under certain conditions do not pass outside of the bodies of the bacilli. These are known by the term *intra-cellular* toxins. Koch's new Tuberculin—the TO-TR and the TA—consisting of solutions of these toxins artificially extracted from the bodies of the Tubercle bacilli are therefore examples of intra-cellular toxins.

In marked contra-distinction to these toxins—which by a strange anomaly are employed because of their *antitoxic* action —stand the broad class of serums or sera. These are obtained from the blood of animals which have been previously inoculated with Tuberculin or some allied substance. Such are the sera of Moragliano, Bereneke, Marmorek, Glub (Tubercucidio, etc.), Von Ruckr, and a host of others.

In referring to work which has been done in connection with the more outstanding of these remedies, one naturally begins by considering the oldest of all, namely, Koch's *Original* TUBERCULIN.[1]

Outside of veterinary practice it now finds few supporters in this country. Its value for diagnostic purposes in cattle cannot be gainsaid: and in dermatological practice it appears to have been used with success. From perusal of the excellent address delivered before the International Society of Dermatology (1905), we gather that amidst all the host of doubters there stands out one in this country whose faith in its value has never wavered. Commencing with its introduction in 1890, M'Call Anderson has used it consistently from then until now; and growing experience has but tended to strengthen his opinion that alike as a diagnostic and a therapeutic agent, Tuberculin is of very great value. The list of cured cases of Lupus—beautifully illustrated —which he sets forth in that address is certainly very striking, and even if he has omitted to confide to us the number of instances in which the treatment failed, he has at least tendered an eloquent and not altogether unconvincing plea for the more general adoption of Tuberculin as a remedy[2] in some forms of Tuberculosis.

One case of Addison's disease seems to have derived some measure of benefit at his hands, and an extensive case of abdominal Tuberculosis with hip complication is claimed as a brilliant example of what this remedy in experienced hands is capable of achieving.

[1] M'Call Anderson. [2] *Glas. Med. Journ.*

Contemporaneous with M'Call Anderson in this country, Trudeau has been employing this preparation in cases of Pulmonary Tuberculosis in America. The reports[1] now published cover a period of twelve years (from 1890 to 1902) and include—without unfortunately discriminating—the results of the employment of other Tuberculins, including Tuberculo Plasmin, Tuberculocoiden and Bacillus Emulsion. The cases treated in this way amounted altogether to 159 and were made up as follows: incipient 43, advanced 104, far advanced 12. The treatment proved practically of no use for the far advanced cases. They all died. Of the incipient cases a slightly greater proportion of those treated with Tuberculin than of the whole number left the Sanatorium with arrested disease—the figures being 93% in the former as against 89% in the latter class. Amongst the advanced cases the advantage lay decidedly on the side of the Tuberculin-treated patients, of whom 82% were discharged with the disease arrested as compared with 57% of the total number. He concludes his report by saying that, provided pyrexial and very advanced cases are avoided, the benefit to be derived, both in the increased number of the cures and in their permanency, from Tuberculin treatment is so striking, and to his mind so indisputable, that it ought to form a definite adjuvant wherever sanatorial treatment is being carried out.

Hardly less striking than those figures are the figures stated by Pottinger.[2] He gives us the results attained by treatment of 1100 cases of Early Pulmonary Tuberculosis; 611 of these trusted to sanatorial measures alone, and the remainder, numbering 589, underwent inoculation treatment by one or other of the culture products at the same time. The fact that only 64% of the former were cured as compared with 84% of the latter, is considered by him a very strong evidence in favour of the marked value of the specific treatment. At the same time, whilst emphasising this point, he lays great stress upon the point that "when using the specific remedies no other treatment of recognised worth should be neglected. The fact is apt to be lost sight of and to bring Tuberculin treatment into disrepute."

There is a certain amount of resemblance in these figures supplied by different workers, figures which show an advantage of nearly 20% in favour of the Tuberculin-treated cases as compared with those treated by other means. This relationship is still further supported in a remarkable degree by figures collected by Batty Shaw and quoted in an address delivered before the University Medical Society, London, in January 1905. These refer to what are called *first stage* cases only, and they

[1] "Tuberculin in Tuberculosis," *Zeit. für Tub. und Heilstatt*, September 1904.
[2] *Zeit. für Tuber. und Heilstatt*, December 1904.

include the reports of such well-known observers as Bowditch, Klebs, Sanderson, Brown, Petruschky, and others. In some cases as high as 100% of cures are claimed where Tuberculin has been used, whilst where it has not been used the highest percentage of cures noted is that by Trudeau of Adirondack, viz. 68%. The figures read thus :—

Of 611 non-Tuberculin-treated cases there were cured 62%.

Of 656 Tuberculin-treated cases there were cured 91%—a very striking comparison.

Whilst there have been available for years quite a number of sera—notably those of Moragliano, Bereneke, Marmorek, and von Ruck—in so far as the trials which they have received, if we except Moragliano, have been inadequate, it may be well to suspend judgment upon their value at present. Moragliano's has now been before us for nearly ten years, but in so far as independent observers in other countries—notably in Germany—have not been able after a fair lapse of time to substantiate the claims set up on its behalf by its discoverer, it does not provide us with a profitable subject for consideration at the present juncture. Twelve months ago, Wilson of Sheffield reported two cases treated by Bereneke's serum and recommended its being further tried. Paris [1] reports that he has used it in 65 cases, and in all the first stage cases, amounting to 14, cure was effected; and of the remaining 51, 7 others completely recovered. A few cases have been treated by it in Edinburgh during the past six months, but we understand the effects traceable to its action have not been considered specially striking.

Marmorek's serum—no doubt on account of the reputation of its discoverer—has attracted more attention in this country. Latham tried it on 25 cases at Brompton last year, and was able to assure us that so far as could be observed it had not done any harm.

Stephanie (*Le Prog. Médical*, 21st June 1905) records his experience of Marmorek's serum in seven cases of different forms of Tuberculosis. He found that in the lung cases its primary action was to increase the physical signs of moisture in the region of the lesions, and this was accompanied by an increase in the amount of expectoration. These phenomena were, however, of a temporary character, and soon gave way to diminished moisture and signs of improvement. Three of the cases have been sufficiently long under the treatment to permit of deductions being made. In one—an early case—immediate improvement set in, and in the other two the relief obtained was described as phenomenal. As the remaining cases are still under treatment he does not deal with them. His general conclusion

[1] *Revue Médicale de la Suisse Romande*, 1904, xxiv. 10, p. 629.

is that the serum is at once a safe and powerful agent for good in the treatment of Tuberculosis.

Bassano[1] infers, so far as it is safe to infer from so small a number as five cases, that—

1. It produces its most marked benefit in surgical cases.
2. That in these cases pain is invariably promptly and markedly alleviated.
3. That there is at first in medical and surgical cases alike an initial rise in temperature followed by prompt fall.
4. That in lung cases the same temperature holds good in regard to expectoration.

He can point to one case, and that in a case of Lung Disease complicated by Abdominal Tuberculosis (necessitating the performance of laparotomy) and Hip Disease.

Although the evidence upon which his favourable opinion is based seems to us insufficient, he is of opinion that the serum should receive further trial.

Dieulafoy (4 cases), in *Bulletin de la Société de la Thérapeutique*, 1903, No. 39, and Championierre (5 cases), in *La Semaine Médicale*, 1903, No. 49, are distinctly unfavourable in their opinion of its value. And on the other hand a favourable opinion is founded upon the results attained in its use in, in all, 31 cases, by Klein and Jacobson (*Bulletin General de Thérapeutique*, vol. cxlviii. p. 132), Rothschild Brunier (*Progrès Médical*, 1904, p. 375), Montalti, (*Progrès Médical*, 1904, p. 283), and Jaquerod (*Revue de Médecine*, 1904, p. 375).

Enough has been quoted to show how conflicting is the opinion held concerning this remedy, and the fact that its value is by no means yet established.

Those who have been keeping in touch with the work which is being done in the direction of finding a satisfactory specific serum were in hopes that the International Congress held in Paris recently would bring to light some valuable advances in that line. Only to a very minor extent has that hope been realised. Two communications are worthy of attention.

Dr More Laffont,[2] in a paper describing "a new Tuberculin and its action combined with that of a stimulating artificial serum, describes the lines upon which he has been working since the year 1897. The writings of Metchnikoff, he says, first inspired him, as they have inspired so many others, to seek for a serum which should stimulate phagocytes, favour their propagation, and increase the amount of protective substance in the host. In a substance called *Cytophyllin* he claims to have discovered the object of his search. In support of his contention he quotes the

[1] *Lancet*, September 9, 1905, p. 819.
[2] *Le Progrès Médical*, 30th September 1905.

results obtained by him in the treatment by this agent of 134 cases of Pulmonary Tuberculosis in man, nearly all of whom were in an advanced stage of the disease. Twenty-one out of 32 cachectic cases died; but of the remaining 102, he records that no less than 41 of their number at the time of writing had been — although not absolutely cured — economically cured, *i.e.* restored to full working capacity. He also reports that by altering the technique by which it is prepared he has succeeded in elaborating what is practically a new serum. With this new serum he has during the past year treated 47 cases of Pulmonary Tuberculosis, of which two have died, and of the remainder practically all have recovered sufficiently to be able to return to work. The evidence he gives is encouraging, but does not seem to us to be based upon an adequate number of cases.

But the one announcement of commanding interest made during recent times is undoubtedly that with which the distinguished name of Behring is associated. His address delivered at the International Congress in Paris, and translated into a host of languages, has been flashed throughout the length and breadth of the civilised world. These reports have not been confined to medical journals. Purveyors of news, well knowing that in any announcement of a "New Cure for Consumption," especially one associated with so eminent a name as that of Behring, there lay most excellent copy to be welcomed with avidity by the man in the street, have not hesitated to use this copy for their own ends and purposes. The result has been that we have for days on end witnessed the spectacle of statements attributed to Behring which in many cases it is morally certain were never made by him, side by side with inaccurate and unwarrantable conclusions formed in the minds of the reporters, crowding the columns of our daily papers. That a reaction will set in is tolerably certain, and if a disappointed public at length turns and assails the reputation of a great man, the great man cannot altogether reasonably complain. For in choosing a semi-lay meeting at which to announce the progress which he has so far attained in a difficult line of research, and in announcing as a probable remedy a substance whose remedial properties have not yet been tested, much less established, the scientist has certainly laid himself open to hostile criticism.

The contents of the paper read by Prof. Behring at Paris, familiar as they must be to our readers, do not demand full notice here.

One other development in Serum Therapeutics demands attention. That it has been reserved to the last is not because the interest which it has aroused, or the value which attaches to its consideration, is in any degree inferior to those which have

been cited. For quite the contrary is the case. In the discovery of A. E. Wright we have one of the very greatest possible value, one which bids fair to revolutionise the whole treatment of bacterial disease, and to add to the treatment of Tubercular disease in particular, an efficiency and, if we may judge from the promise already given, a success hitherto unknown. For the discovery has not to deal with a particular remedy, but rather with *a method of applying* remedies. By a series of brilliant experiments Wright and Douglas have demonstrated that the protective substances elaborated by the host in the presence of a bacterial invasion are to be found in the blood serum, and that they facilitate the action of phagacytosis by lending an attractiveness to the organism which renders it peculiarly acceptable to the multi-nuclear cells which forthwith proceed to prey upon it in countless numbers. And further, that by an accurate and scientific method the amount of these particular substances (opsonins) in the blood can be estimated with precision. The knowledge which these observers have imparted to us, and the ingenious if intricate technique which they have provided, enable us to observe the variations which take place in the content of the blood, and to use it for purposes of regulating dosage, and determining the times at which remedies may be administered to greatest advantage. It has been shown in connection with Tuberculosis that succeeding the inoculation of Tuberculin (TR) and allied substances, there ensues a direct fall in the amount of the protective content in the blood—called by Wright the negative phase—and that this fall is immediately succeeded by a rise in the amount of such content to a level usually higher than that at which the inoculation took place. The negative phase has been shown to correspond to a period of lowered resistance in the individual, and as successive re-inoculations performed during the negative phase tends to produce a "cumulative negative phase," a continuance of such procedure is liable to eventually lead to a spread of the disease. On the other hand, by regularly examining the blood from day to day we are placed in possession of information which enables us in re-inoculating to avoid the period corresponding to the negative phase, and to choose a point standing at a higher level than that at which the previous inoculation took place. By repeating the operation from time to time, as shown by Wright and since confirmed by others, it is perfectly possible by means of re-inoculation to raise the resistance to the level and even to beyond the level of normal health. That this is an enormous gain, the results already attained in some forms of Tuberculosis—particularly in some surgical forms—clearly prove. And they seem to indicate that

the researches of Wright and to a less extent of others—particularly Douglas and Bullock—have placed in our hands a weapon of inestimable value in the treatment not only of Tuberculosis, but of bacterial diseases in general. Even although it be granted that the application of this knowledge is still practically in its infancy, enough has been shown to convince the writer that, when they have been fully developed and the far-reaching effect of their operation is known and understood, the profession will accord to its discoverers a right to rank with Virchow, Pasteur, Koch, and Behring, as members of our profession who in our day have proved themselves great benefactors of mankind.

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MEDICAL JURISPRUDENCE

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CRIMINAL ABORTION: EVIDENCE FROM WOUNDS ON THE FŒTUS

THE employment of any means whatever by which the contents of the gravid uterus are caused to be expelled before the full term constitutes the crime of "criminal abortion." But in law

the mere fact of endeavouring to procure abortion brings upon the inculpated party the same accusation. Thus the simple, and in most cases happily unsuccessful, attempts of women to provoke their own abortion may lead to the punishment of felony.

The determination of the fact as to whether an abortion has been induced by criminal means, whether it has been due to mere accident, or whether it has been spontaneous, must always remain in medico-legal practice a problem very difficult of solution. Even in this country the crime of provoking abortion is unhappily very common, and the records of our criminal courts show how large a number of individuals are charged with this offence.

In this communication I do not intend to speak of those drugs which are supposed to act more or less directly on the gravid uterus, but of what may be termed the more direct means which are usually made use of to procure abortion. It has to be remembered that in many cases the means adopted leave neither in mother nor fœtus any indication of their employment.

It is a matter of common knowledge amongst the laity that any means by which the membranes are ruptured or the "waters" drawn off will lead to the expulsion of the uterine contents.

As to the means employed to bring about abortion, violent compression of the gravid uterus may rupture the gestation sac, and therefore a rough bi-manual examination of the uterus at an early period of pregnancy may be followed by abortion. The cervical canal may also be dilated and the finger introduced, and the membranes torn through by the finger-nail. Without the help of sponge or tupelo tents this must be a rare procedure, as it is by no means easy to dilate the cervical canal with the finger during the earlier months of pregnancy.

It is much more common to find that more or less sharply pointed instruments, such as wooden sticks, steel or bone knitting needles, iron skewers, etc., are used. Those who possess some anatomical knowledge employ sounds, catheters, or bougies, which are introduced into the cervical canal exposed through a vaginal speculum. In other cases a syringe provided with a curved cannula is made use of to inject certain liquids into the uterus. Such liquids as are supposed to have an ecbolic power are introduced, such as solutions of quinine, ergot of rye, or soap. These injections mainly act by stripping the membranes from the uterine wall.

When such instruments are used to procure abortion, and especially when employed by those ignorant of the anatomy of the parts, it is a common occurrence to find the upper part of the vagina and cervix uteri injured. These injuries usually take the form of punctured wounds which vary in depth, some being

quite superficial, while others penetrate deeply, channelling the cervical tissue and uterine walls. They may be found to penetrate the fundus or posterior wall of the uterus, or they may find a way into the peritoneal cavity through the fornices. When visible from the vagina, such injuries are to be recognised as somewhat dark spots with slightly ragged edges, and it is only by the insertion of a sound or probe that the penetrating character of each wound is made out. As a rule the whole extent of the channel is darkened by a slight extravasation of blood.

It is those cases of extensive wounding of the uterine wall, or where there has been perforation, which afford the largest proportion of medico-legal examinations. Septic peritonitis compels the unfortunate individual to obtain medical advice, and, as the disease is only too frequently fatal, the post-mortem examination reveals the cause.

Far otherwise is it, however, when the membranes have been ruptured by smooth instruments passed through the cervical canal with some degree of skill, as by expert midwives or by those who have received medical or surgical training. In these cases the abortion often terminates satisfactorily to the mother, and even were the fœtus injured by the means employed it is usually got rid of, and so the crime passes unrecognised.

Period at which abortion is provoked.—It is only when the second menstrual period has been missed that the woman becomes anxious as to her condition, and endeavours to restore the flow by means of hot baths, drastic purgatives, salts of iron, or various vegetable infusions. If, however, the pregnancy progresses, the woman becomes more desperate, and thus we find that criminal means of provoking abortion are practised usually between the fourth and sixth months. The greatest number are induced at the fifth month, or when doubts of her condition can no longer be entertained by the woman because of the presence of fœtal movements.

Wounds of the fœtus.—As might naturally be expected, actual injuries to the fœtus in cases of criminal abortion provoked by instrumental procedures are rare. Tardieu (1) states that of 288 autopsies on the bodies of premature infants, only 69 furnished any evidence of the crime of provoked abortion, or about 24 per cent. Brouardel (2) writes that of 67 cases of abortion which he had collected, only 8 of the fœtuses exhibited wounds, or not quite 12 per cent.

At those periods when criminal abortion is most commonly practised the fœtus is protected to a large extent from external injury by the surrounding liquor amnii. If, therefore, we find evidence of injuries on the fœtus, it indicates that very considerable force must have been used. Not only must the resistance

interposed by the membranes have been overcome, but a force employed sufficiently great to allow of the instrument reaching the fœtus through the isolating liquid medium and of injuring it. When, therefore, we find on the body of the fœtus punctured or lacerated wounds, we must assume that these could only have been produced by a sharp instrument introduced into the uterine cavity *per vaginam* for the purpose of rupturing the gestation sac, and of inducing a premature discharge of its contents.

When the fœtus has been injured in this manner the head is the usual seat of the wounds, the vertex or occiput being that part which is most liable to injury by reason of its being the common presenting part. In the eight cases reported by Brouardel the forehead and eyebrows were injured in two instances; the scalp and back of the fœtus in one; the outer side of one arm had received two punctures in one case; a wound 1 cm. deep was found in the axilla in another case; while in the remaining three the wounds were indefinitely described, but all showed that they had been criminally produced.

As a rule the wounds on the fœtus are superficial, and when they occur on the head are confined to the scalp. Though usually in the form of stabs, occasionally cuts or lacerations of the scalp are met with, and in a few instances the injuries have been so severe that the fontanelles, or even the cranial bones, have been pierced, and the brain injured.

Sometimes, however, anomalous cases give rise to discussion, and the preceding observations were suggested by reading an interesting case narrated carefully by Dr Patoir (3) in a recent number of *L'Écho Médical du Nord*. The question turned on whether a certain abortion was spontaneous or provoked, and the following is a short summary of the facts:—

During the five weeks preceding abortion the woman had suffered from metrorrhagia. Labour pains came on during the 15th September. Next day there was free hæmorrhage, and at midnight the woman asserted that the membranes had ruptured spontaneously, and fœtal movements ceased from that time. On 17th, hæmorrhage, with clots and pain. A medical man was called in next day. He found the temperature to be 39.3 C. (102.7 F.), and sent her to hospital. A very offensive odour came from the genital canal. On the 19th, before any obstetric measures had been adopted, a spontaneous and abundant discharge of very putrid cerebral matter from the fœtus took place. Three hours later a fœtus at about four and a half to five months' gestation was expelled. The skull was quite empty, and the head was attached to the trunk by the vertebral column alone, and so feebly that it fell off during delivery. The right arm, together with the scapula, was also

detached during delivery. In other words, the fœtus was (especially towards the upper part of the body) in an advanced stage of putrefaction.

On examining the empty and flattened head, a semicircular crescent-shaped opening, with somewhat irregular and bare edges, was found situated at the vertex and behind the anterior fontanelle. The wound penetrated through the hairy scalp and the subjacent parietal bone, and lay in the centre of a bloody extravasation. It had more the character of a tear than of a clean cut, and the scalp was undermined for a considerable extent around the opening and infiltrated with blood. The high temperature in the mother and the offensive discharge had been caused by the decomposition of the fœtus. The cerebral tissue had escaped through the opening in the vertex of the skull. Dr Patoir discusses the conditions under which putrefaction of the fœtus may take place in the course of a spontaneous abortion. When the membranes have been ruptured and the fœtus has died, the latter may undergo a rapid putrefaction, and this is facilitated if any means have been employed by which organisms are carried in, as by the examining finger or by instruments. As to the wound on the head, the infiltration of blood into and beneath the scalp indicated a vital reaction which could only have taken place during the life of the fœtus, and therefore it could not have been due to putrefaction. The author argues against the supposition that the head had been ruptured by engaging in the pelvis, and states that even when the fœtal head is subjected to severe and prolonged pressure, it only undergoes a change in shape. Neither could it have been such a spontaneous traumatism as is described by Bonnaire, for these relate to compression of the abdomen. Dr Patoir concludes that the injury to the head was produced by some instrument introduced for the purpose of provoking abortion. The instrument had not been very sharp, as shown by the wound being more in the nature of a tear. The rupture of the membranes, together with the head injury, had caused the death of the fœtus, and organisms having been carried in, decomposition soon ensued in the head and upper part of the body.

Ollivier (4) also records a case of injury to the head of a fœtus at the sixth month of utero-gestation. The wound had been made by a sharp instrument over the upper part of the right parietal bone. The skin had been cut deeply, and much blood had been infiltrated into the subcutaneous tissue around the wound. The head had been struck obliquely by the instrument which pierced the membranes. In this case the dead body of the fœtus was found in a cemetery.

Bayard (5) narrates the case of a fœtus at the fifth month of gestation expelled after a rapidly fatal illness of the mother. The fœtus had evidently died some days antecedent to its expulsion, as intra-uterine maceration had commenced. In the region of the anterior fontanelle there was an extensive ecchymosis, and in the centre of this a linear wound with cleanly cut edges. The wound was transverse, and had cut through the longitudinal sinus, blood being effused on to the surface of the brain. Pelvic peritonitis was present in the mother, and Dr Bayard concluded that such an instrument as a sound or stylus had been used to perforate the membranes, and that it had penetrated the head of the fœtus and had caused its death some days before its expulsion.

The same author records the examination of the dead body of a fœtus of about four months' gestation. From the vertex of the cranium as far as the cervical vertebræ a clean cut through the skin extended, and under the edges there was an infiltration of blood. On the front of the chest there were four linear incisions, sharply cut and obliquely directed from left to right with the edges also infiltrated with blood. Dr Bayard concluded that the wounds had been made with a sharp cutting instrument, which had repeatedly slipped on the head and chest owing to the mobility of the fœtus, and that these injuries had been inflicted in the production of abortion.

A third case reported by Dr Bayard was that of a fœtus found on the street. It had arrived at the eighth month of utero-gestation. A vertical wound 8 mm. long was found over the occipital region which penetrated through the bone and into the cerebellum. Much blood had been infiltrated under the scalp, between the muscles of the neck and over the surface of the brain. A sharp cutting instrument had been introduced for the purpose of rupturing the membranes, and had caused these injuries to the fœtus. The wounds had been insufficient to kill the fœtus, however, and this had been accomplished by strangulation and pressure on the abdomen sufficient to cause rupture of the liver.

Tardieu (*loc. cit.*) relates an extreme case of destruction of the fœtus. A woman aged thirty-three years died after two days' illness, and the post-mortem examination revealed extensive septic pelvic peritonitis, the result of perforations caused by instruments introduced. In the uterus remains of a fœtus were found, *e.g.* the parietal bones, bones of the upper arms, one of the vertebræ, and some of the ribs. Each of these was broken up, and all were enclosed in blood-clot. The pregnancy had advanced to two to two and a half months, and abortion had been caused by direct methods, as evidenced by the punctures. The

fœtus had been violently broken up at a period not more than forty-eight hours before death.

It will be noted that in three of the preceding cases the body of the fœtus was alone found. This goes to show that a provoked abortion had been carried through successfully to the mother, else there would have been records of her death. In such cases the membranes must have been ruptured through the cervical canal, and the instrument had been introduced with such force that it had come against and had injured the fœtus.

It appears to me that much unnecessary argument has taken place as to whether apparent injuries on the fœtus were due to intrauterine maceration, or actual decomposition. The first of these is in no sense of the word a decomposition, but is an attempt on the part of Nature to make resolution of the organised constituents of the fœtus. It is entirely a natural as contrasted with an organismal process. As a result of this, the fœtus may shrivel up, may be changed into adipocere, or may undergo calcification. If the gestation sac remain intact, a complete barrier is formed against the entrance of organisms from without. It is therefore quite incompatible to find intra-uterine maceration along with wounds on the body of the fœtus. If, on the other hand, we find the uterine contents undergoing the changes which we associate with ordinary decomposition in the air, then we must conclude that criminal abortion has been attempted. In no other way could saprophytic organisms gain entrance than by operative procedures, which have not only caused the death of the fœtus, but have at the same time introduced those organisms which grow in dead tissues and in this way have brought about the ordinary phenomena of decomposition.

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4. Ollivier. "Sur l'Avortement provoqué," *Annales d'Hygiène publique*, 1839, T. xxii. p. 109.

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New Books and New Editions

Principles and Practice of Medicine, for the Use of Students and Practitioners. By WM. OSLER, M.D. Sixth edition, revised and enlarged. Pp. 1143. London: Sidney Appleton; New York: D. Appleton & Co. 1905. Price 21s.

THE sixth edition of Osler's "Principles and Practice of Medicine" has been set from an entirely new manuscript, and contains many alterations and additions. Professor Osler has made use of a different classification to that of previous editions; the diseases due to Protozoa have been grouped together, and new sections have been written upon Tropical Anæmia and Trypanosomiasis. Numerous additions and alterations are found in the chapters on Infectious Diseases, Constitutional Diseases, and Diseases of the Nervous System. The book has attained such well-deserved popularity, both with students and practitioners, and holds such a unique position as a text-book, that it would be idle to attempt detailed criticism; it is sufficient to say that this edition is well up to the standard of its predecessors, incorporating the newest views and most recent work in Medicine and Pathology.

Though there are so many additions to the text, the enlargement of the page and the use of a different style of type have enabled the publisher to keep the work within the limits of a single volume; we must, however, confess to a preference for the former paper and type, which had advantages from the reader's point of view.

Golden Rules of Sick Nursing. By W. B. DRUMMOND, M.B., C.M., F.R.C.P.Ed. Post 32mo, pp. 97. Bristol: John Wright & Co. Price 1s.

THIS very small volume contains a large amount of good advice and useful knowledge, which should be very helpful to nurses. Although much of it relates to practical work, which can be best acquired by seeing how to do and doing, it includes also much from the theoretical and the æsthetic side, which a good nurse ought to know and practice. The defects of the book are those which are inseparable from teaching by aphorism. The booklet is highly commended.

Manual of Chemistry, Inorganic and Organic; Covering the Synopsis of the Conjoint Board and the Society of Apothecaries. By ARTHUR P. LUFF, M.D., B.Sc. (Lond.), F.R.C.P., F.I.C., and FREDERIC JAMES M PAGE, B.Sc. (Lond.), F.I.C. Third edition, revised throughout. Pp. 538, with 43 illustrations. London: Cassell & Co., Ltd. 1905. Price 7s. 6d.

A THIRD edition of Dr Luff's well-known "Manual of Chemistry" has just been issued by Messrs Cassell & Co. The volume is so favourably known to students of medicine that little need be said in its praise. It makes no claim to be an exhaustive work on chemistry, but it was designedly written for medical students, and contains all that one could naturally expect such a student to be cognisant of. The section dealing with the analysis of a simple salt and of a mixture containing two bases and one acid is quite adequate, and the short account of volumetric analysis is clear, and so makes the volume more complete than ever.

The only fault we have to find in the work is the unnecessary inclusion of a description of some of the newer synthetic drugs (aspirin, heroin, veronal, mesotan, etc.). No student of pure chemistry would be required even to know the names of such remedies, and they are more properly treated of in a work on materia medica.

We know of no text-book on chemistry which contains so much information in so small a compass, while at the same time the instruction is conveyed in an interesting and pleasant manner.

The Child's Diet. By J. SADLER CURGENVEN, M.R.C.S., L.R.C.P. London: H. K. Lewis. 1905.

THIS is a little book of 96 pages, which the author says he has written mostly with the idea that it may be of some use to his own patients. It is written in a simple way, and contains a number of useful recipes, including a list of twenty-five starchless puddings. Some may think the author goes a little too far in his advocacy of a restricted use of starch and sugar in the diet of growing children, but it is to be hoped that other people's patients, as well as his own, will take to heart his chapter on the importance of mastication.

All Communications—including **BOOKS** *for* **REVIEW** *and* **EXCHANGE JOURNALS**—*are to be addressed to* THE EDITORS, 7 *Manor Place, Edinburgh,* AND NOT TO 43 CASTLE STREET.

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